AMERICAN AGRICULTURIST

For the Farm, Garden, and Household.

"AGRICULTURE IS THE MOST HEALTHFUL, MOST USEFUL, AND MOST NOBLE EMPLOYMENT OF MAN."—WASHINGTON.

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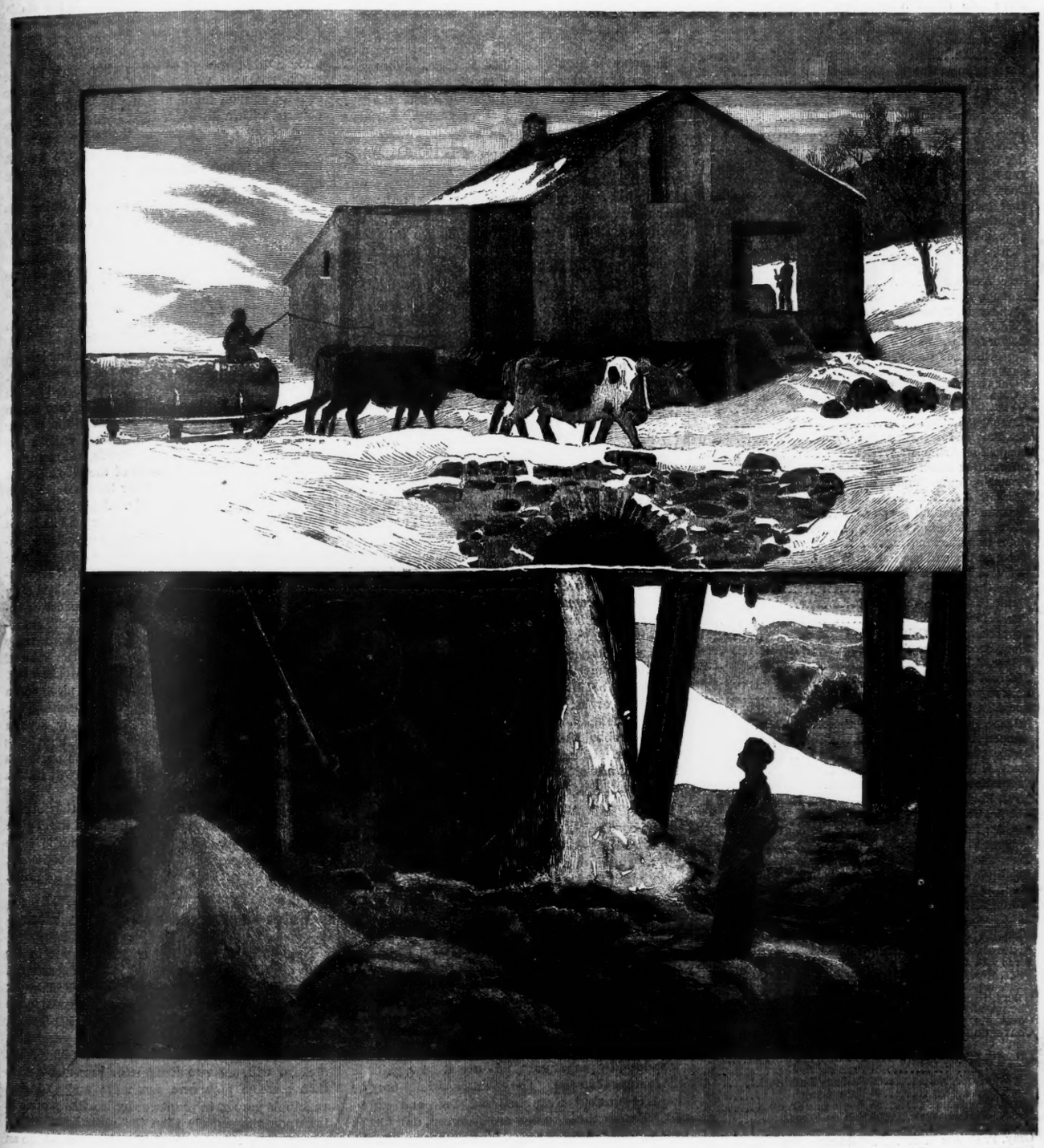

THE OLD SAW-MILL AND ITS WATER-WHEEL.—*Designed and Engraved for the American Agriculturist.*

When the logging is excellent, which in some localities often lasts for only a short time, the scene in and around a country saw mill is a very busy one. The heavy sleds come loaded with the large logs, and carry away the plank and boards. Day and night the great wheel is kept turning by the force of the falling water, and communicates its motion to the saw, which runs with great speed.

The artist gives us a view of a country saw mill, and to use his expression: "A study from nature." It is a very respectable looking mill—far more so than many that are located along our water courses. The lower half of the engraving gives a view of the great wheel, one of the most interesting parts of a saw-mill to a schoolboy who may be deep in the study of natural philosophy.

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Contents of this Number.

[Articles marked with a star (*) are illustrated: the figure with the star indicates the *number* of illustrations.]

Agriculturist in the West..... 6
Apple, "Grimes' Golden"..... 21
Bee Notes for January..... 5
Birds and Canker Worms..... 18
Box, A Bushel..... *.. 9
Box, A Plant, with Divisions..... *..20
Boys and Girls' Columns:—*The Doctor's Talks:* Pop Corn, Hygrometers, Frost and Snow—Our Puzzle Box—The Fox and the Bear—A Plug Puzzle—Illustrated Rebus — Oysters and Oyster Farming..... 10*..26-28
Burning Bush, The Broad-Leaved..... *..21
Cattle, The, of Holland..... 2*..13
Cherry, For One—The "Kentish"..... *..23
Coop, A Feed for Chickens..... 2*..11
Corn, Green, in England..... 23
Crops, Rotation of, and Manures..... 10
Cut-Worms in the Garden..... 20
Dahlias, The Single..... *..21
Door, Barn, Fastenings..... 2*..20
Emigrants and Land Seekers..... 7
Farming as an Occupation—II..... 17
Fences, Portable Iron..... 2*..16
Field, An Improved..... *..15
Gate, A Double Spring Latch..... 2*..14
Gate, A Sliding..... *. 20
Globule, The Butter..... 14
Henderson, Peter, Speaks out in Meeting..... 6
Holder, A Pig "Trap," or..... *..18
Holder for Corn Fodder..... *..20
Horse Shoe and Its Application..... 11
Household:—Household Plants—Why not a Palm. Our Graham Flour. Consider the Children. A Pop Corn Picture Frame. Frost Bites and Chilblains. Ventilating a Cellar..... 3*..24-25
Humbugs, Sundry..... 5-6
Ice, Provide for Next Summer's..... *.. 6
Incubation, Artificial..... 16
Information About Southern States..... 7
Lectures, Agricultural in Illinois..... 6
Markets..... 35
Museum of Natural History..... 19
Nitrogen, Something About..... 9
Notes from the Pines..... 22
Notes on Orchard and Garden Work..... 2-3
Orchard, My First Peach..... 22-34
Osage Orange from Cuttings..... 8
Panic-Grass, The Variegated..... *..23
Pen, A Nursing, for Sheep..... *.. 9
Peppermint, The Cultivation of..... 23
Plow, Snow, A One-sided..... *..18
Pulper, A Home-Made Apple..... 2*..19
Rack, A Large Feed..... *. 15
Rosa rugosa as a Standard..... 8
Saw-Mill, The Old, and its Water-Wheel..... *.. 1
Science, Popular—Keeping Warm..... 3-4
Scraper, A Texas Road..... *..14
Scraper and Mud Mat..... 8
Shaft, A Broken, for Grindstone..... 2*..18
Suggestions of and for the Season..... 2
Teat, Remedy for Hole in..... 8
Thistle, The Canada..... *..17
Tie, An Improved, for Cattle..... *..19
Tobacco as a Window Plant..... 8
Tree, The Mammoth, in England..... 34
White Grub and Strawberry Borer..... 20
Wood as Fuel..... 7
Worm, The Army..... 3*..12

INDEX TO "BASKET," AND OTHER SHORT ARTICLES.

Apples, American Abroad. 34
Artichokes for Swine..... 34
Birds and Grapes..... 34
Bugs, Mealy..... 36
Bugs, Squash..... 34
Celery, Nice Cooked..... 34
Cherry, Wild, for Stocks. 34
Chestnuts, Spanish..... 34
Conventions, Beekeeper's and Others..... 34
Crops in Washington Territory..... 34
Earwigs..... 36
Eggs, Preserving..... 36
Farm, The Echo..... 34
Fence, Barbed Wire..... 36
Four Bovine Scourges... 8
Gray, Prof. Asa..... 34
Gypsum, Plaster of Paris. 34
Hens, Feed for Laying... 8
Hops and Manures in England..... 34
Incubation, Success in... 36
Irrigation..... 8
Japan and Japanning..... 36
Kerosene and Canada Thistles..... 34
Lambs, Fatality Among.. 8
Law, The Beauties of the. 16
Omelette, A Recipe for... 8
Peaches, Thinning..... 21
Pecan Sprouts..... 15
Poultry to Market..... 36
Prophet Without Honor.. 8
Pruning the Peach..... 36
Pruning the Spruce..... 36
Railway Building..... 6
Rain Gauge..... 8
Roots in a Drain..... 8
Salt on Wheat..... 36
Societies, Reports of Hort. 36
Soldering Brass..... 36
Stamps, Old Postage..... 34
Weeds..... 7
Wheat, a Change in..... 8
Worms, Cabbage, Once More..... 34
Year, Beginning of the.. 34

☞ **Subscription Terms on page 42.**

See specially now page 35.

AMERICAN AGRICULTURIST.

NEW YORK, JANUARY, 1882.

Suggestions of and for the Season.

The beginning of the year should be a time for the balancing of the farm accounts. New books are opened, and with the inventory taken, as suggested last month, the farmer knows how he stands. The first of January usually brings an end to the paper subscriptions, and if not already attended to the renewals should be made at once. It may be that some farm journal or family paper has come to sight that will need to be added to the list of those already counted as necessary. Farmers as a class are yearly reading more and more, and for a number of very good reasons. The improvements of farm machinery allow of more time for mental culture; and not the least of the reasons for an increased reading among farmers is the better quality of the matter provided for them by the agricultural press.—It may be that the insurance policy runs out with the old year, and this important safeguard against distress should be looked to. Only the best companies should be patronized; the rates for ordinary farm buildings should be comparatively low. A co-operative system of insurance has worked admirably in some localities.

It is now midwinter, and much of the farmer's labor is to keep himself and family, and the farm stock, warm and comfortable. For the household there will be a good supply of fuel needed. This does not mean that a sizable pile of green wood just from the living tree, and full of water, is adequate. Dry, well seasoned wood is the only kind that is either pleasant or economical to use, especially in the stove in early morning. The man who, with a large wood lot on his farm, does not provide a good supply of dry wood for the household, is not doing his duty. The slip-shod method of chopping the daily wood on the day it is to be used, though it may give a *freshness* to the product, is a fruitful source of bad breakfasts and bad tempers, and it may be in extreme cases leads to harsh words and disgraceful actions. All this can be avoided by cutting a year's supply of wood during the winter, and giving it the whole of the following summer to become thoroughly dried. In this way the cutting and splitting of the year's fire wood becomes a part of the regular winter work on the farm. The methods to be observed in harvesting this crop should be as systematic and economical as any other. Unless the land is to be cleared, the trees that are old and dying should be cut first, thus preserving the wood lot in good condition.

Live Stock Notes.

The cow stable should be kept neat and clean. Unless this is done the milk cannot be perfectly pure. The air of a filthy stable will taint milk that is drawn in it, and when the air is foul, the cows under such lack of care will be more or less dirty, and some of this filth will find its way into the pail. A careful milker will remove by brushing all such matter that might, in part, otherwise reach the dairy room or the consumer of the milk. Milk is a valuable product, and the satisfaction of producing it as well as the pleasure of using in the household economy, depend upon its purity. At no time in the year is it more valuable or more difficult to have it pure than in the winter, therefore the one who does, by proper care, produce it now, gains in more ways than one. The cows should not only be kept clean, but well sheltered, fed, and watered. Unless these things are observed, dairying in winter must be a source of loss. Just what the shelter shall be, must be determined somewhat by circumstances, and the daily rations will vary with the crops grown, and the system of management. Whatever the feed may be—hay, cut straw, cornfodder, each with a quantity of ground feed, or a combination of them all, it should be given with great regularity. An hour before the time one day, and an equal period after on the following day, is an irregularity in which the farmer who looks to a profit from his stock, cannot afford to indulge.

The horses will generally have an easier time during winter than in the busy months of spring and summer. They should not therefore receive a light food and less care, but be so kept that they will be in excellent trim when the spring opens. Horses that come to the heavy work of spring without an accumulation of flesh, or stored up force, are unfit for the work, and have not been properly and therefore profitably wintered. The remarks under cattle, as to neatness in the stable, a plenty of feed, and pure water apply with great force in the case of horses. Serious injury is done to many horses, by being exposed to cold winds after a hard drive, and when they have become much heated. All drafts of cold air should be avoided at such times, and the body of the horse covered with a blanket. Sweaty horses that are taken at once to a warm stable, seldom need the protection of blankets, and if they are used it makes the animals more susceptible to chills when hitched out of doors.

The very early lambs are dropped during this month, and if mild weather favors them they may be made very profitable for the early market. Should the weather be severe, the lambs must be kept from being chilled through; this may be done by wrapping them in blankets and administering a little hot ginger tea. The ewes should have the warmest pens in the stable, and may need to be nursed with warm gruel for a few days.

Pork, of late years, has been a profitable crop only when grown according to the best methods. This includes the keeping of the best breed for the kind of pork desired. Small breeds that fatten from birth and yield a good carcass within a year are suited to small farms near market, while a pig with a larger frame, a slower growth, and maturing later may suit the larger farms of the West. It not only does not pay to keep poor breeds, but a good breed must not be kept poorly. A pig is a machine for flesh making, and it must not expend its forces in other directions. A pig is an unprofitable animal to turn the compost heap—other forms of labor are cheaper. Cleanness is another essential in profitable pork growing. The pigs should be killed early in the winter, as later keeping is expensive; besides it gives more room for the few that are reserved for breeding. There have been many thorough experiments made to test the value of winter shelter for swine, and they all show that pigs to winter well must have a warm place with a clean bed, and feed enough to be comfortable. They are not to be fattened, but simply kept in good condition. Brood sows coupled now, bring pigs in May, an excellent season, as the weather is warm and settled, and the young pigs will make a rapid growth.

If eggs are desired in winter—and they always are in demand—the fowls will require a warm place and a plenty of food and water. Lime in some form, as powdered oyster shells, old plastering, etc., will be needed to furnish material for shells.

Notes on Orchard and Garden Work.

Note—Work! The first and last words in the title of our monthly remarks in this department, demand a passing word. It is assumed that work is one of the first principles of success in the orchard and garden. Without work, hard work, and an abundance of it, the growing of vegetables, and the raising of fruit must prove a failure. An orchard will not run itself with profit any more than a steam plow or a saw mill; and to keep a vegetable garden in proper order is often more of a tax upon the muscle than the steering of a ship. Along with this labor of the hand must go an activity of the mind. The seed drill and the pruning knife, as well as all other orchard and garden implements need to be used intelligently. Let no one believe that he can succeed in this department without thinking—gardening is not a mere pastime, and fruit growing is far from being an occupation for a man who will not work his brains.

With this view of labor it is evident that there are two sets or classes of implements to be used by the gardener and horticulturist in the performance

of his work;—implements to be used in the hands, and tools to aid the head. A hoe is a garden implement, but it is no more of one than a principle of plant growth, which, when understood, makes every stroke of the hoe more effective. The best seed planter that modern mechanical skill produces could be only a source of loss when guided in its work by one who knows nothing of the conditions most favorable for each of the many garden seeds. These principles which underlie proper, and therefore profitable gardening, are the accumulated experience of all past ages, and are put within the reach of all in books upon the various subjects which belong to the orchard and garden. Some of these books are of a general character, and treat of vegetation as a whole, without making special reference to any particular vegetable or fruit. Such books give the ground work or fundamental principles upon which the special treatises rest. For example, the nature of soils, the composition of the atmosphere, and the physiological laws which govern the growth of plants are general subjects which involve principles that apply to all vegetation. The person who knows these principles — understands how plants grow, when, where, and how they get their foods, is certainly possessed of superior tools in the culture of field or garden crops. We can serve our readers no better than to commend to them the careful study of the two books: "How Crops Grow," and "How Crops Feed," by Professor S. W. Johnson. A thorough mastery of these two volumes—and they are not large ones—will not only make all future farm or garden labor more intelligent, but more pleasing and profitable. There is no time that is better adapted for this work of storing the mind with valuable knowledge than during the long evenings of midwinter. The busy days of spring and summer usually leave but little time for study; but thanks to labor-saving machines, more time can now be spared for systematic thinking.

Orchard and Nursery.

There are several books devoted specially to the interests of the orchardist. We do not know of a book that gives more valuable information for the outlay than "The Fruit Garden," by Patrick Barry. The language is plain and clear; it treats the whole subject of fruit-growing, and is not confined to the garden fruits, as the title might suggest. An important feature of Mr. Barry's book is the attention that is given to the statement of principles that underlie the successful growing of young trees—a part of the book that is the outgrowth of a lifetime of practical work in one of the largest nurseries in the world. Another work of great value is "The American Fruit Culturist," by J. J. Thomas, which contains a very full descriptive list of the leading varieties. Warder's "American Pomology" is another work, which, though not including all that the title would lead one to infer, is excellent as far as it goes; it is in some respects a western book, both as to nursery management, and the descriptive list of apples. For a larger and more expensive work Downing's "Fruits and Fruit Trees of America" is invaluable.

There are not many things to be done in the orchard at this season of the year. Manure may be carted, or better, if there is snow, drawn out on a sled among the trees. Cions can be cut, tied in bundles, labeled, and stored in sawdust or sand. The clusters of the Tent Caterpillar can now be cut away, thus saving the trees from the attacks of the worms that hatch from them in early spring.

The Fruit Garden.

The books on fruit culture mentioned under the preceding heading contain much upon the "small fruits," but there are a few important works that treat specially of the products of the fruit garden. The leading one of these is Fuller's "Small Fruit Culturist," a new and revised edition of which has just been issued from the press. "Success with Small Fruits," by E. P. Roe, is a larger and profusely illustrated work. Among the leading books devoted to a single fruit are Professor Husmann's "Grape Growing and Wine Making," Fuller's "Grape Culturist," White's "Cranberry Culturist," and Fuller's "Strawberry Culturist." These books, if carefully read, will teach the grower of small fruits many valuable facts and principles. They will also inspire him with a greater love for his work. It is our desire that every farmer should have a well stocked Fruit Garden, that his table may be supplied with choice fruit from the time the earliest strawberry ripens until the latest grape is gone. It has been our misfortune to sit down to a summer dinner at the table of many a farmer, upon which there was no sign of a fruit of any kind. A man with even a ten-acre farm cannot afford to be without a portion of it devoted to the growth of such fruits as strawberries, raspberries, blackberries, currants and grapes.

The Kitchen and Market Garden.

The leading helps of intelligent vegetable gardening are the "Gardening for Profit," by Peter Henderson; Quinn's "Money in the Garden"; and Brill's "Farm Gardening and Seed Growing." All of these are thoroughly practical, and are written by men who do not keep the secrets of their success from the reader. There are a number of books and pamphlets devoted to special crops, such as "Onion Raising," by J. J. H. Gregory. Also his works on Squashes, Cabbages, Carrots, etc.

The present work in the garden consists in looking after the stored crops that they may not suffer from extremes of heat and cold. The cold frames need daily care, and the sashes should be closed only when the temperature is below 30°. Hot-beds may be started this month for early vegetables in the Southern States. Now is a good time to perfect all the plans for the work for the next season. It is well to have the orders for seeds sent in early. Much can be learned from a careful reading of the catalogues of the various seedsmen, and they should be procured so soon as issued.

The Flower Garden and Lawn.

It may be that the grounds are to be improved the coming year, and a work like Mr. Weidenmann's "Beautifying Country Homes" will offer many valuable suggestions. Downing's "Landscape Gardening" is another standard work. Those who feel that only a trifle can be expended in a book will find Henderson's "Gardening for Pleasure" a valuable guide to the management of small places. There are a number of special treatises in this department, as "Parsons on the Rose," etc.

There will be but little out-of-door work at this time. If heavy snows fall, the limbs of the Evergreens will need attention. The load of snow is best removed so soon as it has fallen before it has become frozen to the bushes. The paths should be used in winter, and no crossing of the lawn by either vehicles or persons on foot should be tolerated; it spoils the looks of the ground to have "sheep paths" thus made in winter by those who would sacrifice beauty to save a few steps.

Greenhouse and Window Plants.

The admirable work, "Winter Greeneries," by E. A. Johnson, and "The Window Flower Garden," by J. J. Heinrich, will furnish valuable assistance to those who wish to grow plants and flowers in-doors. The two principal items in the care of house plants are water and insects. Plants suffer greatly from a lack of proper watering. The whole soil of the pot should be kept moist. The frequent and light application of water that only keeps the upper layer wet, is ruinous to successful plant growing. On the other hand, most plants will succumb when the roots are continuously kept sopping wet. It is sometimes well to withhold watering until the plants show the lack by wilting, that it may be certain that the watering is not overdone. The Red Spider is one of the worst "insect" pests, but is not difficult to destroy by frequent washing of the foliage with water. The Mealy Bug is much easier to find, from its large size and white color. It must be removed by hand picking.

Popular Science.—Keeping Warm.

Some Scientific Facts and Principles, Plainly Stated, with Practical Lessons they Teach.

During January and February, over most of this country and the whole northern hemisphere, a large proportion of the time, effort, and expense of all classes is devoted to keeping warm—a much larger proportion than one would suppose without some thought on the subject. Fuel is only one item; fourfold clothing and bedding as compared with summer, warmer dwellings and largely increased food supplies are to be reckoned in. There are some scientific principles involved, so simple that all may comprehend them, an understanding of which will be of practical advantage. They apply to all warm-blooded land animals, man included.

98½°

The bodies of all human beings are so constituted that while some parts may be temporarily benumbed with cold without danger, the blood that circulates through the heart and through the system generally, *must* be maintained uniformly at just about 98½° of temperature (98½° Fahrenheit, or 37° centigrade). If the heat of the blood rises or falls only 6 or 7 degrees from this normal point, and continues so, fatal results are expected. Every degree that disease elevates the general internal heat above 100°, is a rapid approach towards the danger point, and when only 105° is reached, the most skillful efforts of physicians are usually needed to save life. On the contrary, even in the coldest regions where the thermometer marks 60° or 70°, or more, below the freezing point, the internal heat *must* be kept up, and if it falls only from 98° to 94° or 93°, and continues thus, there is great danger that the wheels of life will stop. (These are general statements, applicable to a healthy condition. Cases have been reported where in tetanus or lockjaw the temperature rose to nearly 111°, while in asthma it sunk to 78°, and in cholera to 67°.)

Developing Heat.

The natural process of maintaining the uniformity of blood temperature is a most interesting study, of decided practical utility to every one. Whatever the nature of heat, its relations to electricity, to mechanical and chemical force, its various methods of production or exhibition, etc., we all know some of its *effects*, and some methods of securing its manifestation. We know it may *apparently* exist in an invisible or inactive form; that in a cold room with cold wood or coal and cold matches, we can develope intense heat; that ice water poured upon ice cold unslaked lime will produce a scalding temperature; that beating cold iron with a cold hammer will sensibly warm it; that simply rubbing two cold pieces of wood together, makes them hot; that electricity from a cold battery sent through a fine wire or a film of charcoal, will produce the intense heat that gives the electric light. So chemical or mechanical, or electrical action, developes heat that was before latent, or insensible, or that existed in another form.

How Heat is Diffused.

We know also that heat is *radiated*, that is, it flies out in straight lines, as from a fire or the sun; we can feel the heat strike us. These heat rays can be bent like light rays, by interposing a reflecting surface in their path to change their direction.

Heat is also *carried* as freight, so to speak, as when air takes it from a stove and carries it to the top of a room, or from a hearth fire out of the chimney; or when water particles carry it from the bottom to the top of a kettle set over the fire.

Heat is also *conducted* or passed along from one body to another, and also from one particle to another in the same substance. Hold one end or side of a piece of metal to a fire, and the nearest particles of metal will take in heat, and pass it to the next particles, and these to the next, and so on until the heat is *conducted* a long distance. But experience and experiments show that different substances differ very greatly in their ability to thus *conduct* heat through them. This is a matter of

much practical importance, as we shall see. Iron, for example, conducts heat freely and rapidly through itself; wood and glass feebly and slowly. *Air conducts very little heat through its substance*, though it allows *radiated* heat (in straight lines) to pass freely; and if the air particles are free to move, they *carry* heat from one point to another, usually upward, but horizontally when moving thus, as in wind currents.

How Heat is Produced.

The external, artificial heat used for maintaining the warmth of our bodies, beyond what comes from the sun, or from air currents, is mainly derived from chemical action in burning wood or coal. One-fifth of air (of its weight) is a gas called oxygen. Nine-tenths of water is oxygen. In the air the oxygen is simply mixed with another gas (nitrogen) and very readily leaves it. In water the oxygen is strongly united or combined with another substance (hydrogen) which it will not readily leave.—So, while the *free* oxygen of the air increases a fire, the oxygen is tied up in the water, and water extinguishes a fire by shutting out free air oxygen.

Coal, hard or soft, is mainly a substance called carbon. Diamonds are pure carbon in a crystal form. Almost all substances that grow in plant form, and all kinds of flesh, are largely made up of this carbon. If we put under cover (to shut out air) wood, straw, grain, flour, vegetables, fruits, or any kind of flesh, as lean or fat meat, or almost any thing used for food, and apply strong heat, we drive off a good deal of water in the form of vapor, and a little of some other substances, and we have a mass of nearly pure carbon or charcoal left—in bulk usually as large as the original substance heated. This is seen in changing wood into charcoal under a covering of earth, where a little air is admitted at the bottom to burn just enough of the wood to heat or char the rest. The same would happen to masses of our common food put in place of part of the wood. If we admit too much air, the charcoal itself will disappear. Charcoal gives a hotter fire than wood, because this preliminary heating has removed the other substances that in turning to vapor and gases absorb and carry off a great deal of heat.

Some Properties of Heat.

Other preliminary items. Sensible or active heat seems to combine with some substances and *disappear*. If the air in a room should suddenly expand to fill two rooms, some heat would disappear, and the expanded air would feel much colder. If we condense the air suddenly into a much smaller space, it will give up heat that was before insensible. If we put a piece of tinder in the closed end of a gun barrel, and with a close-fitting ram-rod quickly *condense* the air upon the tinder, it will give out so much heat as to set the tinder on fire.

If one pint of water be changed to hot or cold vapor, the vapor will take up and *conceal* nearly 1,000 degrees of heat, or heat enough to raise 5½ pints of water from freezing (32°) to boiling (212°). (If this heat was not concealed, or did not disappear, the clouds, which are cold water vapor, would be much hotter than melted lead.) This heat is similarly concealed, whether the water turns into visible steam at 212°, or passes off as cold *invisible* vapor in the air, or in the *visible* vapor of fogs and clouds. The point is, that the evaporation of water, hot or cold, invariably produces lower temperature by concealing and carrying away a great amount of heat.

We can keep water, milk, etc., cool and render them colder, by wrapping the jug, pitcher or other containing vessel with cloth and keeping this moistened. The evaporation going on carries off heat. If the vessel be thin porcelain or earthen ware or metal, the heat will pass outwardly to the evaporating surface more readily. Damp or wet clothing, for the same reason, quickly cools the body and produces chilliness, and is very likely to induce a cold, especially if not uniformly damp, as we explained under "Catching Cold" last month.

One point more. When air is warmed, it has the power of holding concealed an increased amount of *water* in the form of invisible vapor; and when cooled it gives out this water again in a visible form. There is frequently more water in the air above us on a hot, clear summer day, than on other dark, cloudy, or rainy ones. In the latter case a cold air wave, or other cause, has reduced the temperature of the air above us; it has less capacity for concealed moisture, and gives it up; the moisture thus set at liberty condenses into visible clouds, and if the uniting of these little water globules be continued, they become too heavy to float in the air and fall as rain drops. Heating the air in a room makes it hide water; it becomes hungry for more and extracts it from the skin and from our lungs; we feel parched and disagreeable. Lesson: always keep plenty of evaporating water surface in any and every room warmed by stove, furnace, or in any way.

A Fire in the Blood.

When the oxygen of the air unites with the carbon of hard coal or charcoal, or of wood, or of flour, meat, or of any other food, a compound is formed, viz., a gas, which we call Carbonic Acid. The process of forming this compound sets at liberty heat which was before entirely concealed, or which existed in another form, and when coal or wood is burned rapidly we have a hot fire. The same process goes on when wood rots away, but the heat is developed so slowly that we do not notice it.

Precisely the same thing is taking place in the human body all the time. The food we eat and digest, is in part absorbed into the blood, and carried by it everywhere throughout the body. But at the same time the blood passing through the lungs is constantly picking up oxygen there from the air which we breathe into the lungs, and this, too, goes all through the body, and at millions of points one carbon atom of the food is uniting with two atoms of oxygen from the air, forming carbonic acid, *and setting heat at liberty*, precisely the same as takes place in burning wood or coal in the stove. There is only a small product of heat at any one point in the blood, but it takes place at so many points that there is enough developed to keep up the general temperature. And a wonderful provision it is, that without our supervision, or knowledge even, this ever burning fire goes on within us, just so as to keep the whole body at about 98°. (We speak only of the main source of animal heat. There are other combinations going on in the body, which produce more or less heat, such as the union of hydrogen from food with oxygen, which escapes as water; the union of minute quantities of sulphur and of phosphorus with oxygen, etc. Most probably more or less heat is also derived from the mechanical movements of the various organs.)

If the supply of food fails in the blood for a time, from fasting or sickness, then the oxygen in the blood attacks any stored up fuel, as fat, flesh and other organs of the body, using their carbon to keep up the ever necessary warmth. The weight of the body grows less, and when no more fat or flesh can be found to make heat, cold and death come on. The same result follows if the lungs become so diseased as not to furnish the air supplying oxygen fast enough to keep up the internal fire. Stop the entrance of air for a few minutes by closing the windpipe with a cord, or by filling the lungs with water, and heat production stops in the blood, the temperature falls below 93°, and the human machinery ceases to work.

The carbonic acid produced is poisonous. In the stove it escapes through the pipe. That formed in the blood is carried to the lungs and thrown out into the air. Too many persons breathing in a close room fill it with so much carbonic acid that it becomes very unhealthful, if not dangerous.

The blood carries the heat to the surface of the body, as well as to all other parts, and a good deal of heat escapes off into the air. If the air is cold this escape is more rapid, and more heat must be produced within to supply the waste. That means more fuel, that is more food, *or* more flesh is consumed.—Remember that the blood *must* be kept up to about 98°. Of course, then, in cold weather more food is necessary or the body becomes emaciated. But anything that stops escape of heat from the surface of the body, saves food, or saves using up flesh. Warm clothing, warm air, warm dwellings, warm stables, warm sheds, all help to stop this waste of heat.

Further Practical Lessons.

As to domestic animals, is not the above a positive proof, that sheltering all animals from cold weather, from chilling winds which by their rapid motion carry off heat more rapidly, is the way to save food and to save waste of flesh? If by stopping this waste of heat from the surface all the food consumed will not be wanted to make heat, a portion of it can go to increasing the flesh, that is to producing growth, or more can be used in making milk, eggs, etc., within the animal.

Dyspeptic persons, those having feeble digestion, or a poor appetite, get less internal heat from food combustion, and suffer from cold. Such persons need a warmer atmosphere, or warmer dwellings, and warmer clothing to retain the heat that is produced. This applies to all animals.

Close-fitting garments, garters, lacing, boots, shoes, neck-ties, etc., that prevent free easy circulation of the blood, each and all diminish the amount of heat produced, and its unform distribution. Exercise promotes more rapid circulation of the blood and increased heat production.

We stated above that evaporation of water carries off much heat. Rubbing wet horses and other animals dry is very useful not only to save heat, but also to save cold taking, as explained in our last number. For the same reason any damp garments should be replaced with dry ones as soon as possible, or enough covering be added to prevent chilliness from the evaporation.

Free perspiration (sweating) in hot weather carries off a large amount of heat, and keeps down the temperature. If perspiration be checked, sponging with water aids in cases of sun stroke or depression from heat. Persons have gone into hot ovens unharmed by encasing themselves in moistened garments, the evaporation keeping down the heat about the body. Green wood, besides its inconvenience, is very unprofitable. A large amount of heat which the dry portions would yield, is lost by being carried off in the evaporation of the sap. So of any wet or damp fuel of any kind.

Confined Air a Protection Against Cold.

As confined air is a poor conductor of heat, all fabrics that are porous, that is full of little interstices, tubes, or holes filled with air, are the best protectors to keep heat from escaping from the surface of the body. A loosely woven garment or bed coverlid is warmer than a compact, firmly woven one, because the air in the texture of the former conducts away heat less rapidly than the more solid ones. Loose-fitting garments are warmer than close-fitting ones, for reasons above given, and also because the air space between them and the skin is a non-conductor of heat.

Stone, brick, or wooden walls with perpendicular air spaces in them, are warmer than solid walls, because the air conducts heat away less than the solid materials. A sheathing of tarred paper, or pasteboard, or of any thick paper even, placed midway between the clap-boarding and the plastering, to form two thin air-chambers instead of one, adds greatly to the warmth of a house or other building. Two half-inch boards, set a little apart to leave an air space between, makes a far warmer house wall than the same thickness of wood in inch boards.

A layer of loose straw put between the wall and the earth banking up of a cellar, adds much to the warmth, on account of the air in the meshes of the straw. The same is true in covering roots or apples to be left out in heaps over winter.

Double glass windows are several times warmer than single glass, because of the non-conducting film of air between. So of double doors.

Moving air both carries off heat faster of itself, and also increases evaporation, thus largely diminishing the temperature. A very small crack in a

window, under or over, or by the side of a door or sash, or elsewhere, produces a draft that requires much extra fuel to counteract the effects.

Bee Notes for January.

Breeding Bees.

There is no subject which is attracting more attention from the bee-keepers of America at the present time, than the improving of the quality of their stock by judicious care and selection in breeding. The fact that some colony or colonies each year far excel all the others in the amount of the stores which they gather, suggests to the thoughtful apiarist that were he possessed of the requisite knowledge and skill, the probable profits of his apiary would be far greater than they are at present. *Apis Americana* is a superior strain, or race, of bees that has appeared as the result of superior tact displayed by some bee-keeper in the breeding of his bees. With but little doubt there is in this direction one of the most promising paths towards improved apiculture. The "dollar queen" business, which has grown to such deplorable dimensions in the last few years, as it of necessity precludes all pains-taking, is right in the way of this improved breeding. To make the dollar queen business at all profitable, haste and no pains must be the watch-words of the apiarist. To secure a better type of bees, the utmost caution, and the severest selection must be the firm rule of the bee-keeper.

Care as to Queens.

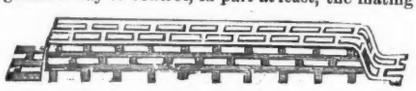
Heretofore, the principal reliance to secure superiority has been in the careful selection and breeding of the queens. It is easy with care to secure the queen-cells from the best colony in the apiary; to see that the queen larvæ are so started from the egg, that they may be reared in times of greatest activity in the hive, so that there may be no lack of vigor from unfavorable surroundings; and to have them in full, strong colonies from the first to the last, that a proper heat no less than a proper nourishment may be secured. All of these points have been observed by those apiarists who look to superior excellence, and not simply to the dollar.

Care as to Drones.

Among our higher animals, the males are known to be prepotent, and it is regarded as important to select the sires with great care as to be particular with the dams. There is no doubt but that this same law holds true among the lower animals, and therefore with the bees. In fact this law is at the basis of sexual selection in nature, as so well developed by Darwin. But our bees mate on the wing, hence to select the drones has heretofore baffled all efforts. The matter has not been practically solved, and the demand for a method to accomplish impregnation in confinement, is still urgent.

Method to Control the Drones.

At the last meeting of the National Bee-Keeper's Society, at Lexington, Ky., Mr. D. A. Jones suggested a way to control, in part at least, the mating



A BEE GUARD.

on the drone side. This is accomplished by the use of perforated zinc as entrance guards to the hives. These guides are ten inches long, and each guide is a box with the bottom and one side removed. A cross section of this box is one inch square. The holes in this zinc are rectangular, $^3/_{16}$ by $^9/_{16}$ of an inch long. The zinc occupies about as much space as that occupied by the holes, that is about one half of the metal is cut away. These holes, while they permit the workers to pass freely through, are a perfect bar to the drones and the queen. Now by placing this guide with the wanting side against the end or side of the hive, before the entrance, we have a perfect barrier to the drones and the queen, while the workers may pass with freedom.

How to Use the Guides.

By placing these guides before the hives, in our own and near neighbor's apiaries, we may preclude the flight of all such drones are not desired to meet the queens. Of course, if there are wild bees in the vicinity, as is always the case if there are forests near by, then this method is only a help, not a sure preventive of undesirable mating. A still better way to use the guides is to let the drones fly from all but the very best colonies on such days as there are no young queens to fly out, and about one or two o'clock put all the guides at the entrances of the hives, and at night, after the bees are in the hives, kill the drones. The drones should always be kept down either by this method or by cutting out the unhatched drone brood, as they eat a great amount of honey and are expensive and worthless appendages to any hive. I permit drones only in my choicest hives.

SUNDRY HUMBUGS

We can usually judge whether a scheme of doubtful propriety is profitable or not by the rapidity with which imitators increase. For example, when the little metallic toys called "Batteries" of various kinds were first put before the public, the original "Battery man" soon had half a score of imitators. No wonder. Useless combinations of cheap metals, producing no electricity, costing only a few cents to make, and a penny for postage, for a while sold "like hot cakes" for $1.00, and then at 50c. each. —Only a few months ago, the solitary "Matrimonial Insurance" scheme was looked upon as a curiosity, which might attract a few peculiar or "cranky" people, and we passed it by with brief notice. To our surprise we now have circulars and documents relating to no less than six similar institutions, and there are probably many others. This rapid increase shows that there must be many people ready to invest money in such companies, and that the managers find them profitable. These

Wedlock or Matrimonial Insurance Companies

are essentially alike. A member buys, for a small sum, a certificate for $1,000 to $5,000, to be paid to him if he marries. He is subjected to various annual payments and assessments, the whole being involved in a mesh of "ifs" and "provideds," which require some study to understand. If any one is inclined to invest in one of these Associations, he should first inquire if it is regularly chartered? In one State they hold only a charter from the Courts, which has been decided to be illegal, and they have made no deposit with the State authorities. Their responsibility is governed entirely by the honesty of the officers. It is stated that the sums paid to agents as commissions are enormous, and entirely beyond what any prudently conducted company can afford to pay. All proper Fire and Life Insurance Companies are under the supervision of State authorities, and give some pledge that they will do what they promise. Unless these concerns can show that they are responsible, don't invest. So much for the legal aspects of the case. If there are sharp companies there are

Also Sharp Investors.

The holder of a certificate in one of these Wedlock Shops, will of course get married as soon as possible, and receive his $1,000 to $5,000, either one a convenient sum to set up housekeeping with. The circulars, though "rather mixed" to ordinary comprehension, show one thing quite plainly—the sooner an investor gets married, the fewer assessments will he have to pay, and the more money will be get. These circulars, no doubt without intending it, really invite people about to marry to join them, and leave those poor fellows who can't get married to pay the assessments. Most of those who do *not* marry speedily will be

Compelled to Forfeit their Polices

on account of the heavy and rapid assessments. Two of these concerns are already reported as having failed. The demands for payment of certificates being too much for them. Their epitaphs should be, "Died of much Marrying." We look upon these schemes as at best of doubtful utility, and advise the many who write asking us about them, to exercise every precaution, and consider the matter well before they invest.

Counterfeit Money or "Queer."

As this dodge is just now revived in various ingenious forms, a word is due to our newer readers. Observe, that no matter what may be the offer, the parties are too shrewd to have any counterfeit money in their possession. The object of each and every such scheme is to induce those who are impelled by their avarice or their poverty, to give good money and to return therefor—absolutely nothing. The swindlers know very well that the swindled dare not "squeal," because, in order to make a complaint, the victim must admit that he undertook to buy counterfeit money. That is the whole story, and while by noticing this we would not imply that any reader of the *American Agriculturist* needs this caution, we make this explanation, *first*, to show why the swindlers are not arrested; they only indirectly pretend to offer, but never have counterfeit money, and *second*, because our readers may know of thoughtless persons who are tempted by these offers, and they may be able to do these a good service by warning them that the thing is in every form a thorough swindle.

The Variety of Disguises

under which counterfeit money offers are made is amusing. One person advertises "Fac-similes of U. S. Treasury and National Bank Bills." No doubt dishonest persons send $2 for a package, expecting to get counterfeit money, but they receive only neat small photographs, of no use as currency. —Another offers "United States Chromos, the best in the market."—Another holds out inducements "to push the sale of a certain class of goods which I manufacture," and guarantees 100 per cent profit. He says: "The goods are used by every one, and the business is STRICTLY CONFIDENTIAL. As it is the same as all other large paying enterprises, it is not exactly legitimate, possibly you can guess its nature. This business is only for those open for almost anything there is money in."—Another is disposed to be facetious. He says: "I do not wish to sell you any *Counterfeit Money*. I would not touch it for the world. **Oh no!** not at all. You might think from the tone of this letter that I have *counterfeit money* of the best *quality*, but my thoughts do not drift in that region. **I am a manufacturer of the Greenback Brand of *Cigars*....etc."

A Grim Kind of Humor

suggests some of the cheap swindles. The sender of a dollar for "instructions for writing without pen or ink" must have laughed when he read: "Use a lead-pencil." That is an old joke. A later one is to offer to send for $5 "an instrument that would play any number of tunes." The buyer must have felt little like laughing when he received a common Jewsharp, and still less so at the intimation that "any fool can learn to play it in a few hours."—Under such fanciful names as "Fairy Organ," etc., the common mouth Harmonicon is advertised in a similar manner, requiring many times its cost to be paid in advance.

Grinding the Farmers.

It is rather singular that the medium through which farmers are most largely swindled, is some kind of a "grinder"—a "Sickle Grinder," or a "Mowing Machine Knife-Grinder." A farmer is asked to sign an agreement—a mere matter of form, you know—to sell the grinders, and return the proceeds when sold. This ingeniously worded "agreement" turns out to be either an order, signed by the farmer for a number of grinders, and for the payment for which he is responsible; or, in some cases a promissory note for their alleged value. This has been so frequently exposed that we have not, for a year or more heard of a "grinder" swindle in the Eastern States. But these chaps have turned to "fields and pastures new," and we now hear of them in Missouri, and at a few other points in the West. Some farmers

in Pike Co., Mo., have timidly paid the demands; others refused, and told the swindlers to "git." Our Missouri friends are reminded of our often repeated caution:

Farmers—Sign Nothing for a Stranger.

Do not even give him your Post Office address in writing, lest it return to plague you. Those who play these tricks should remember that in some newly settled countries there is a Judge, whose name is "Lynch," who often disposes of cases.

"A Pound of Butter from a Pint of Milk."

We supposed that the "Butter Powder" humbug was extinct, but here it comes anew from—of all places in the country—Boston, where they have laws and enforce them. Let it alone!

A "Newspaper Millenium."

....There are many who have started newspapers, and foolishly asked their subscribers to pay for them. We are now on the eve of "A Newspaper Millenium," which will be marked by furnishing a newspaper "absolutely free." It is plainly shown by figures—and "figures won't lie"—that wicked publishers who charge for their paper don't know their business. "The Newspaper Millenium" is to begin by sending the paper for nothing, and making the advertisers pay for the whole. In reading this high pressure circular, we are struck by two facts—1st, the paper will be, when it appears, issued at Cincinnati, a city unfortunately infested by the worst lot of swindlers in the country. And, 2dly, There is to be a premium—a premium as is a premium—so attractive and fascinating—something about "Love," that while the time of issuing the first number of this paper is in the dim, uncertain future, there is no doubt that every intending subscriber wants, and must have, right off, soon, very quick—because "among a gallery of art works it would be picked out and gazed upon and admired and loved above all others." This picture, no doubt too utterly utter, ought to be distributed at once. But wicked express companies will charge all sorts of prices, hence send only 25 cts.—the uniform price of delivery, and get this premium. That 25 cts. from each subscriber is at the bottom of this plausible scheme.

Peter Henderson Speaks out in Meeting.

There are some of the old style gardeners and florists, who do not like Mr. Henderson's way of telling whatever he may know that he thinks will benefit others. There are still left a few of those who believe in keeping "the secrets of the trade." When these found that Mr. Henderson, in his "Gardening for Profit" and "Practical Floriculture," told all that they knew, and many things they had never thought of, they were very angry. Still Mr. H. has helped many to be successful, and we think has been all the more successful himself. Mr. H. having hit upon a method which greatly increased the certainty with which he could raise seedling plants, not only of such rapidly growing things as cabbages, but of slower starting greenhouse plants and of shrubs; employed it in his own establishment, to his great advantage, and might have gone on doing this for years before his money-making method was discovered. But at the Annual Meeting of the Amer. Association of Nurserymen, Florists, and Seedsmen, held at Dayton, Ohio, in June last—of all places in the world, did he go and "speak right out in meeting," and tell every competitor of his money-making dodge. It is very simple, as most valuable things are. In preparing his seed beds, or seed boxes: First, he puts down a layer of good loam, run through a half-inch sieve, and patted down moderately firm. Over this about one-fourth of an inch of dried Sphagnum—common peat moss, such as is used for packing, thoroughly dried, and run through a wire sieve about as fine as a mosquito-wire gauze. This powdered moss, about in the condition of fine sawdust, being evenly spread. Upon this moss was placed a coating of loam about three-fourths of an inch thick, and well levelled. The seeds were sown thickly on the loam, pressed down by a smooth board, and fine moss sifted on, sufficient to cover the seeds, and the whole watered with a fine rose. The top layer of moss keeps the surface always moist, preventing all drying and baking, and allows the young plants to easily reach the light. The layer of soil below it affords nourishment to the seedlings, which, as soon as their roots reached the layer of fine moss below, form a mass of fibrous roots. No one familiar with raising seedlings need to have the advantages of this method pointed out. This method must have been worth to every member of the convention much more than all his expenses in attending it. We commend it to our amateur cultivators, who will find it of great advantage, especially with seeds slow in germinating. We have not tried exactly Mr. H.'s plan, but we have often covered seed pans with a layer of ordinary sphagnum moss, not pulverized, to prevent the soil from becoming hard, and removing it as soon as the seeds began to germinate, but Mr. Henderson's method is vastly better, and he deserves the thanks of all cultivators for freely giving it.

Railway Building.

It is computed that there are between two hundred thousand and two hundred and twenty-five thousand miles of railroads in the whole world, of which nearly one hundred thousand are in the United States. Over six thousand miles of roads have been built in the States during 1881, as against five thousand during 1880. People are dazed by these large figures and naturally ask: Has the thing not been overdone? Is there not danger of another immediate collapse and panic? Perhaps there might be were it not that the bulk of this railroad building is going on in the West, where lines can be constructed much cheaper than in the East, and where the right of way is generally given. It is interesting to watch the friendly competition of the great trunk lines to secure possession and control of the country beyond the Missouri river. This rivalry promises within a half a dozen years to give us as many through lines to the Pacific. Unquestionably the western railroads in the matter of polite attendance, comfortable coaches, eating accommodations, etc., etc., surpass the eastern lines. The Chicago and North Western, for example, make travel a pleasure rather than a burden, whether the passenger be going from Chicago to Marquette, St. Paul, Omaha, or to Northern Iowa, and Dakota. We might name other Western roads whose management our Eastern lines could pattern after with decided advantage to the travelling public.

The American Agriculturist in the West.

Two of the proprietors of this journal have for weeks been travelling through the Western States and Territories, visiting various points of agricultural interest and gathering a vast fund of information for our readers. It is our purpose to have one or more of our representatives constantly on the move in the future through all the great agricultural regions of the West and the Northwest. In addition we have secured the services of leading local writers, who will contribute valuable information regarding their respective States and Territories.

It will thus be seen that we intend in the future to make the *American Agriculturist* specially adapted to the wants of the West. Those therefore of our vast army of readers who have moved and who are moving westward, can continue to subscribe to the *American Agriculturist*, feeling that it will consult their wants and their needs in their new homes.

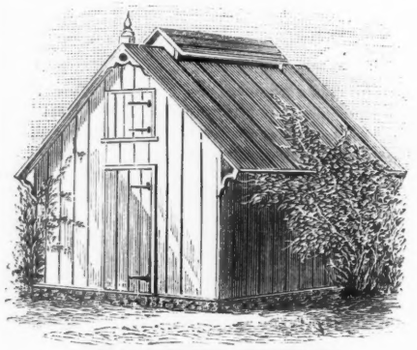
We invite all old subscribers who, upon moving West, have dropped the paper under the impression that it was specially an Eastern journal, to again become subscribers and learn that the old favorite paper is just as useful and instructive to them now as when they resided in the Eastern States.

Agricultural Lectures in Illinois.—During its winter term—eleven weeks, from Jan. 4—the College of Agriculture of the Illinois Industrial University will receive as special students those who desire to attend one or all of the following courses of daily lectures: General Farm Management; Animal Husbandry; Diseases of Animals, and Elements of Horticulture. The largest agricultural library in the West will be open to students. The Annual Agricultural Institute, to which all are invited, will be held the last week in January.

Provide for Next Summer's Ice.—It can be Very Cheaply Done.

Ice is now indispensable to good, successful dairying, even on a small scale, where cool spring water is not abundant. The preservation of food, and the less frequent cooking required, and consequent saving of fuel, will go far towards meeting the expense of providing ice, if it do not more than cover it. This last is of itself an important item on the prairies or wherever fuel is scarce.

There are few farms so small that it will not *pay* to provide for a supply of ice; and it is quite practicable for several small families to combine, and store a lot to be drawn upon by each. A fresh water lake, pond, or stream, is not indispensable for obtaining ice. In the absence of natural resources, an artificial bed can be made by excavating the soil a foot or less, or by enclosing an area with a small bank of earth. A thin grouting of hydraulic lime,



A CHEAP ICE-HOUSE ORNAMENTED.

spread thinly over the bottom and against the sides will hold the water until it freezes an ice flooring. Small additions of water daily or oftener in cold weather will soon give a thick mass of ice. Straw may be thrown over during a hot mid-day, or a temporary thaw. This water may be drawn from cisterns, or wells. Every four small hogsheads of water (63 gallons each), will give over a ton of ice, or 2,105 lbs.—Even on the prairies, there are generally frequent sloughs which can be utilized for an ice pond with little trouble and expense.

A STRAW HEAP FOR KEEPING ICE.—Last summer a "Prairie Farmer" informed us that he dammed a slough, and took out some 25 loads of ice and piled it up closely on a dry spot. He then covered it with several feet in thickness of wheat straw which would otherwise have been "burned to get rid of it." The heap was sloped to shed most rain, and some boards and weighted fence wire put on to keep it from blowing away. About once a week, one side of the heap was opened, a week's supply of ice taken out, and the opening closed by ramming in straw. He had plenty of ice left near the close of August. The ice removed was kept in a large double box, with ten or twelve inches of dry wheat chaff between the outer and inner box. It stood in the shade on the north side of the house, with some straw thrown over it to ward off the morning and evening sun. His labor he did not reckon. The total outlay was less than $4 for rough boards and nails to make the box.

AN ICE-HOUSE that will keep a large supply of ice is a small matter. We have described several that cost only $20 or $30 all complete, which hold 20 tons of ice, and are serviceable for a dozen to a score of years. This is equal to 217 lbs. a day from

May 1 to Nov. 1. A variety of Ice-Houses, simple and cheap, as well as more expensive ones, are described in the recently issued book on "Barns and Out-Buildings," advertised elsewhere. In the September *American Agriculturist* for 1880, we described a very good one costing less than $30, built by a farmer (C. H. Warner, of Lima, N. Y.), whose ice cost him less than 50 cents a ton, interest and wear of the house and putting in the ice included. A New Jersey subscriber sends us a sketch of one very similar, indeed patterned after Mr. Warner's, of which we present an engraving herewith. It stands on level ground, and he has planted shrubby trees around it, partly for shade and partly for ornament. Some of these are shown. This house is 12 feet square, with sills and plates 8x8 inches, of hewn logs, and 8x8-inch corner posts, 8 feet high. Studding is set in as needed. Rough (or planed) boards are nailed horizontally within and perpendicularly without, and the cracks battened with narrow strips. The wall space is filled with sawdust. Dry wheat chaff might be used in the absence of sawdust. The roof is of single boards, with a ventilating opening at the top. The doors are single, with short cross boards inside to hold the ice up. The ice is packed in solid, except a space of 6 or 8 inches all around filled with sawdust. When full, a foot or so of sawdust is put on top of the ice. The flooring is of inch boards laid on a bed of cobble stones. More minute directions, if desired, can be found in the number above named.

Wood as Fuel.

Weight and Heating Power of Different Kinds Compared, etc.—Some Practical Lessons.

More fuel is required during January than in any other month in the year, and a few items may be interesting as well as useful. Another article ("Keeping Warm") describes the production of heat. Carbon (pure coal) is the chief source of all heat used for domestic purposes and for driving machinery by steam power. This carbon is mainly derived from wood, hard coal, and peat. Coal is most used for producing steam power, but taking the whole world together, wood is much the most extensively used fuel. Por the present purpose we may consider all wood as essentially composed of carbon or charcoal, and water (mainly as sap). All woods heated away from the air yield watery vapor, chiefly, leaving nearly pure charcoal, which when burned leaves more or less mineral matter as ashes. Of green wood one-third to one-half or more of its weight is water, partly depending upon the time of cutting. In Schüller's experiments—

100 *lbs.*	*Cut in January.*	*Cut in April.*
Ash Wood contained	29 lbs. water.	38 lbs. water.
Sycamore "	33 " "	40 " "
White Pine "	52 " "	61 " "

A practical lesson for this month is here indicated. All kinds of wood cut in January contain from 15 to 25 per cent less water than after the sap is in motion in April, and considerable earlier in the southern portion of the country. It is well to now cut down the trees designed for fuel, even if working them up is delayed to the following months.

As wood seasons naturally in the air, it loses one-sixth to one-third its weight of water, but still retains one-seventh to one-fourth its weight of moisture. A considerable part of the latter may be expelled by kiln-drying, and most of it if the kiln heat be raised to 212°, or boiling water temperature. Some careful tests made by one of our Western readers showed that *five* cords of Beech and Maple just cut weighed as much as *eight* cords of the same wood when thoroughly air seasoned. The above teaches

Two Important Practical Lessons.

First.—To haul and handle green wood requires a very large waste of strength. In handling five cords of green beech wood for example, we have loaded, hauled, and unloaded, three or more tons of useless water, which a few month's seasoning would have removed.

Second, and still more important: When wood not thoroughly seasoned is used for fuel, its water or sap must be expelled before its carbon comes into play to produce heat. This takes place gradually on the outside, or on one side, as little of the carbon comes into action at a time. But as stated in another article, the escaping vapor conceals or carries off a very large amount of heat, sometimes almost enough to use up all the heat produced by its carbon. It is safe to say that on the average, a cord of green wood will not supply for use one half as much heat as would be yielded by the same wood after thorough seasoning.

A cord of wood is 128 cubic feet as it lies piled up. The dimensions of a cord is usually 4 feet high, 4 feet wide, and 8 feet long, (4×4×8=128). 4 feet high, 3 feet wide, and 10⅔ feet long make a cord (4×3×10⅔=128). But allowing for the interstices in fairly piled wood, we may reckon a cord to actually contain about 72 cubic feet of solid wood.

Thoroughly dry wood weighs about as follows:

	Pounds. 1 *cubic ft.*	1 *cord.*		*Pounds.* 1 *cubic ft.*	1 *cord.*
Hickory	62 lbs.	4,464	Soft Maple	37 lbs.	2,664
White Oak	53	3,816	Wild Cherry	37	2,664
White Ash	49	3,528	White Elm	36½	2,628
Red Oak	45½	3,276	Butternut	35½	2,556
White Beech	45	3,240	Red Cedar	35	2,520
Apple Tree	43	3,096	Yellow Pine	34	2,448
Black Birch	43	3,096	White Birch	33	2,376
Black Walnut	42½	3,060	Chestnut	32	2,304
Hard Maple	40	2,880	White Pine	26	1,872

The average amount of *dry charcoal* obtained from a Cord, by careful experiments ranged as follows:

Hickory	1,172 lbs.	Hard Maple	617 lbs.
White Ash	888 lbs.	Black Birch	604 lbs.
White Oak	826 lbs.	Chestnut	590 lbs.
Apple Tree	779 lbs.	Yellow Pine	585 lbs.
Black Walnut	687 lbs.	Wild Cherry	579 lbs.
White Elm	644 lbs.	Soft Maple	551 lbs.
White Beech	635 lbs.	Butternut	527 lbs.
Red Oak	630 lbs.	White Pine	455 lbs.
Red Cedar	624 lbs.	White Birch	450 lbs.

Numerous tests have been made with different kinds of wood to ascertain how long one pound of each would, in combustion, maintain 10° of heat in the same room. These ranged from 6 hours for Butternut, Soft Maple, and White and Black Birch, up to 6 hours and 40 minutes for Hickory, Ash, and Apple. The variation is less than would be expected, but in this case, each kind of wood is taken thoroughly dry, so that the experiments are essentially the result of burning an equal amount of charcoal from different woods.

Relative Value of a cord of various seasoned woods, taking into account weight, heating power, etc., and calling Hickory wood worth $5 a cord:—

Hickory	$5.00	Black Walnut	$3.25	Soft Maple	$2.70
White Oak	4.05	Black Birch	3.15	Yellow Pine	2.70
White Ash	3.85	Hard Maple	3.00	Chestnut	2.60
Apple	3.50	White Elm	2.90	Butternut	2.55
Red Oak	3.45	Red Cedar	2.80	White Birch	2.40
W'te Beech	3.25	Wild Cherry	2.75	White Pine	2.10

We find no record of careful experiments to test the relative value of two woods extensively used in some parts of our country viz., Cottonwood and Basswood or Linden. The Hickory named above is what is known as the Shell-bark Hickory (*Carya alba*). The "Pig-nut Hickory" (*Carya porcina*), is of nearly equal value. The "Western Hickory" (*Carya sulcata*) weighs about 25 per cent less than the Shell-bark, and its relative value per cord is estimated at $4.05, or the same as White Oak.

In travelling on the upper Missouri where Cottonwood is the chief fuel obtainable, with occasional supplies of Ash, we found the experienced steamboat men would take on Ash wood at $3 to $3.50 per cord in preference to Cottonwood at $1.75 to $2.50. They also, when obtainable, tried to keep some Ash on hand to get up greater steam-power when having to ascend particularly rapid currents in the river.

Information About Southern States.

Various pamphlets and other documents are issued from time to time with a view to attract settlers to the Southern States. Some few of these are published by State authority, others by land companies, and still others by individuals who act as Real Estate Agents. The publications of the last named sometimes remind us of the glowing descriptions of Martin Chuzzlewit's Eden, but taken as a whole, these documents need not mislead, and are useful to intending settlers. We have several papers on the Resources and Capabilities of Texas, by Col. Wm. W. Lang, of the Southwestern Immigration Company, one of which gives a very useful map, and what appears to be a fair account of that immense State. The most valuable publications of this kind, because made with no other object in view than to present the facts, is a pamphlet on the Climatology of Florida, by our old friend and correspondent, Dr. Charles J. Kenworthy, of Jacksonville, Prest. Florida Medical Association, etc. This was originally a paper presented to the Florida Medical Association, which caused it to be published, with matter added by the author, for distribution. Probably few persons know Florida from one end to the other better than Dr. K., who has visited nearly every point on both shores in his yacht, and explored its many streams and lakes in every direction. With all the zeal of a sportsman he has gone over every part of the State, making observations as a man of science. The result is a pamphlet of 70 pages, full of information of the greatest value to those who look towards a residence in Florida for the benefit of their health. Made by a medical man to a body of his medical brethren, it is entirely unbiased by any local influences, and gives just the information needed, not only by those who seek for a suitable place in which to settle, but by physicians who advise their patients to go to Florida. The pamphlet does not indicate how it may be obtained, but we suppose it may be had at the Jacksonville book stores.

For Land Seekers and Emigrants.

The February number of the *American Agriculturist* will contain an illustrated article on the various land grants in the West, Northwest, and Southwest, which invite emigration. It will be from the pen of Mr. David W. Judd, who has been visiting these large tracts of lands with a view to procuring just such information as those of our readers may require who contemplate moving westward, and either purchasing or locating (under government acts) lands along the great railway thoroughfares which are so rapidly opening up the country. The article will be published in German as well as in English, with a view to extensive distribution in Europe. Those desiring extra copies of the paper to send to their friends, would do well to order them in advance.

Weeds.—Many years ago the writer was requested by the late Dr. Darlington to revise his "Agricultural Botany," and it appeared with the title of "American Weeds and Useful Plants." Out of regard to the venerable and beloved author, his original plan of the work was followed in the edition. This plan is less popular than is desirable, and in a measure deprives it of its usefulness. Since that edition was published, many new plants have made their appearance as weeds, and the writer has for some time been aware that the work must either be revised or be replaced by a new one, and he has been for some years collecting materials for the purpose. He would ask the aid of the readers of the *American Agriculturist*, who can greatly assist by reporting the recent advent of any new weeds, or the invasion of cultivated grounds by plants not before considered as troublesome. While in the older States nearly all the weeds that annoy the cultivator are introduced from abroad, this is not so generally the case in the newer States of the Far West, where the indigenous growth is often troublesome. We will be glad of information from any quarter upon the weeds of the farm and garden, and would especially call attention to the agressive grasses which, in some localities, injure meadows and pastures and lawns to a great extent without at first arresting attention. The assistance of friends on the Pacific Coast, whose growing season begins while it is mid-winter on the Atlantic slope, is especially asked. Specimens are desirable, and it is not necessary, as many suppose, that they be sent in the fresh state. If first dried between the folds of a newspaper,

under pressure, or between the leaves of a valueless book, they will reach us in a much more useful condition than if packed in a box with moss.

Fatality Among Lambs.—J. F. Ferguson, Lapeer Co., Mich., writes in substance:—"I separated my lambs from the ewes on September 28th. They have been salted weekly and were watered from a well, but would not always take water. I salted them on Saturday, and at 9 o'clock on Sunday morning found five of them dead, with several others suffering greatly. They are taken with a severe chill, and fall down, straining, throwing the head far back; they breathe rapidly, froth at the mouth, and die in about an hour, a bloody slime coming from the nostrils after death. The same disease appeared about three years ago on another farm, where out of 100 I lost 20."—This letter was referred to Prof. A. Liautard, of the American Veterinary College, from whose reply we extract the following:—"The symptoms and all the conditions taken together point to a form of *Anthrax*, a blood poison, due to the presence of *bacteria* in that fluid. If post mortem examinations, which should be very carefully made, show the spleen to be much enlarged, there will remain no doubt as to the nature of the disease. The disease proceeds so rapidly that there is little to be hoped from medical treatment. The better way is to at once remove all the well animals to some other locality, allow plenty of rich food and pure water. All dead animals should be buried deeply and covered with a layer of quicklime. It would be better, if practicable, to burn the carcasses. The barns, sheds, or other buildings in which they have been kept, should be well disinfected, first removing the bedding and manure, which should be burned or thoroughly mixed with quick-lime."—*Anthrax* is described in an article by Prof. Liautard, in October last, p. 393.

Feed for Laying Hens.—A correspondent asks: "Can hens be made too fat to lay?"—Yes indeed. Fat hens rarely lay. If hens are fed so much or so often that they begin to fatten rapidly, they will soon stop laying. He asks again: "Is there any thing better than corn to make hens lay?"—No food is better than Indian corn or ground corn (Indian meal), to fatten hens, and of course it should be fed sparingly to laying hens. If hens do not lay and are fat, feed them but once a day—at evening just before they go to roost—giving wheat screenings, buckwheat, and oats, in such proportions as you judge best. Throw the feed upon clean ground only so fast as they pick it up. Stop just as soon as you see any of the flock begin to wander away. Let them forage all day for weed seeds, grass, insects, etc. They must have warm quarters, well ventilated at night, and a sunny run by day in winter. After a while begin to feed them sparingly a little meat scrap chopped fine, broken bones, oyster shells, etc., and they will probably soon begin to lay.

Remedy for Side Hole in Cow's Teat.—Mr. "W. T. C.," Monmouth Co., N. J., writes: "I have a valuable young cow with a hole in the side of one of her teats. How can it be successfully treated?"—Make the edges of the opening "raw" with a sharp knife, or cauterize with a pointed stick of nitrate of silver. The hole may then be closed with strips of adhesive plaster, or better yet by a coating of "collodion," which can be obtained of any photographer, if the nearest druggist does not keep it. In milking be careful not to displace the dressing—and it will perhaps be better to draw the milk with a tube for several days. If the opening in the teat is not quite small, it may be necessary to close it by a stitch just through the skin with a fine thread. In most cases the scratching of the edges of the opening with a knife and the application of collodion will, however, be sufficient.

Roots in a Drain.—Mr. G. W. Finley, Allegheny Co., Pa., finding a 3-inch terra cotta waste pipe obstructed, drove some nails crosswise in a long slat, and with it drew out a tuft of roots. The specimen sent us is about 30 inches long, and like rather coarse auburn hair, so fine are the fibers. Mr. F. thinks it is the root of an Elm, or a Silver Poplar, both of which grow near by, and suggests carefully cementing the joints of such pipes to keep out roots. Such obstructions are far more frequent in tile drains than is generally supposed. In laying pipe drains near trees great care should be taken to so adjust the ends and the collars, that a small root can not enter.

Irrigation.—Several who inquire as to the practicability of irrigation in their localities are informed that the work by Henry Stewart, "Irrigation for the Farm, Garden and Orchard," (Price $1.50), discusses the subject in full. Where the natural conformation of the land will allow, storage reservoirs may be made to collect the rain-fall of a large area and preserve it for use. A correspondent in Indiana, who properly objects to the Hydraulic Ram, on account of the waste, and wishes power for other purposes, should look at the various steam engines advertised.

A Recipe for Omelette.—"Aunt Mary," Carlinsville, Ill., sends her method of making an Omelette, which she thinks is better than any she has seen in print. To six eggs, take one cup of milk; put a slice of bread in the milk and mash fine. Cut fine some cold ham, and place it in the frying pan. Beat the eggs thoroughly, mix them with the milk and bread and turn upon the ham when that is hot. When brown on the underside, set for a while upon the upper slide of the oven, and when done turn out on a plate and serve. It will not fall but be light even when cold, while omelettes made with flour will fall, unless eaten very hot.

Osage Orange from Cuttings.—"E. O.," Billings, Mo., writes that he has been told that an Osage Orange shoot, if buried, will throw up a sprout from nearly every bud, and asks why this is not the quickest way to make a hedge. The Osage Orange grows readily from cuttings, both of the branches and the root, but experienced hedgers use only plants raised from seeds. The labor of making the cuttings is much greater, but the great objection is the lack of uniformity of the plants thus raised. In setting a hedge it is important to use plants as nearly alike as possible in size and vigor, else those that have a slight advantage at first, in size and strength, will keep it, crowding the weaker, and preventing that uniformity so desirable in a complete hedge. For this reason the first step with hedge plants, when they are taken up in the fall, is to carefully assort them and tie in bundles, so that in planting those in any part of the hedge will be as much alike as possible. If a dozen cuttings were raised from a shoot they would be very much unlike; those from the terminal bud, and a few other buds nearest the top would be much more vigorous than those from buds lower down, and some of them would be of such slow growth as to be unfit for planting in a hedge. We comply with our correspondent's request in asking that any one who has made a successful hedge from cuttings will report it and his manner of procedure.

Tobacco as a Window Plant, is recommended by a correspondent of an English journal. It certainly has much to commend it; its broad, green leaves, and stately habit, while, should it flower, its abundance of bloom would be showy, and continue long. The tobacco stores often have it as a sign, which shows that it will endure neglect.

What is a "Molly?"—The English market measures are confusing enough to a stranger. They have sieves, and punnets, and pottles, and now we learn from "Gardener's Chronicle" that peas are "scarcely ever sent in 'mollies'—3 pecks."

A Change in Wheat.—Our correspondent, J. L. Mustard, Washington Co., Pa., who makes many experiments with grain, gives an account of one with wheat. He procured a peck of "Russian Black-beard" wheat, and twelve heads of the same showing black chaff and beards. Before sowing he shelled out these heads, and mixed the grain from them with the peck, and sowed the whole. When ready to cut, all the field had the whitest beards he ever saw upon wheat, not a single black beard could be found, though the grain itself was precisely like that which was sown. He knows that at least the grain from the twelve heads had black beards, and he is in doubt whether these grains all failed to grow, or whether the chaff and beards changed from black to white. We think the latter the probable explanation. A black color upon chaff and beards is unusual, and may be due to some peculiarity in the soil where the wheat grew. Being sown where this local influence did not exist, the chaff returned to its usual color.

Rosa rugosa as a Standard.—We have now and then said a word in favor of the Japanese rose, called in Japan the Ramanas Rose, and known to botanistst as *Rosa rugosa*. Its foliage is so rough and firm, that it repels the insects that attack ordinary roses; its flowers appear through a long season, and though single have the purest and strongest rose fragrance, while its very large hips, of the most brilliant scarlet, make it nearly as brilliant in fruit as in flower. We have grown this rose in the bush form, but the "Gardener's Chronnicle" states that it has seen it trained to a single stem, as a standard, and very effective in fruit against a background of evergreens. We can readily understand the superior beauty of this, one of our favorite plants, in the form of a standard, and hope to try it next season.

Rain-Gauge.—A number of our friends have asked us how they can make a rain-gauge that will not cost much, and will be fairly accurate. If any of our readers can help in this matter, we hope they will do so and describe any rain-guage that they may have found useful. In the meantime, we will work at "this end of the line," and, out of all, we hope something useful may come.

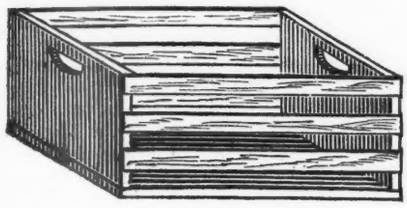
A Scraper and Mud-Mat should be at the back door, or that by which the men folks enter, of every farm house. Even if there is a rear porch, and those who enter find a place to change their boots for slippers, the boots that are now outside should be cleaned. A scraper is easily made of a piece of hoop iron, so fixed that its edge may be used to remove the most of the mud from the soles, leaving the finishing to the mud-mat. Strips of wood, in the form of a blunt triangle, may be strung together by a cord, using a knot if need be, to keep them sufficiently apart. Strips placed in this way will present a blunt edge uppermost, and help remove what the scraper does not take off. A useful mud-mat may be made of a strip of plank, bored with inch auger holes, and corn husks (shucks) pulled into the holes and made fast with pins of wood driven in from below. A mat of this kind will greatly aid the housewife in keeping out that which is known by the comprehensive term, "dirt."

"Four Bovine Scourges," is the title of an ample quarto, by Thomas Walley, M. R. C. V. S., of Scotland, which treats of the four leading, and most destructive cattle diseases. Pleuro-pneumonia, Foot and Mouth Disease, Cattle Plague, and Tubercle or Scrofula, are the diseases classed as scourges, and they are treated by one of the most eminent veterinarians of Great Britain. These diseases being discussed in full, and illustrated by colored plates showing their effects upon various parts, the work is one of great value to all practitioners of veterinary medicine and others interested in these diseases. Price $9, post-paid.

The Prophet Without Honor.—In beer-drinking Germany, it is said that the favorite kind of this beverage in any given town, is always that which is made somewhere else. The use of the thermometer also illustrates the same fact, that the prophet is without honor in his own country. In England and America the scale in use is the invention of the German, Fahrenheit. In Germany, on the other hand, the scale of Reaumur, a Frenchman, is used. In France, of all places, we should expect to find a French scale, but the Centigrade used there was invented by a Swede, one Celsius.

A Bushel Box.

Mr. "R. H.," Orange Co., N. Y., makes a box in the following manner that holds just a bushel:—Cut a 12-inch pine board in foot lengths; these make the ends of the box, as shown in the engraving, made from Mr.



"H.'s" sketch. The sides and bottom are made of strong lath 18½ inches long and securely nailed to the end pieces. These boxes can be packed closely and are handy for harvesting and marketing potatoes, apples, etc.

A Lesson in Agricultural Chemistry—Something About Nitrogen.

BY PROF. W. O. ATWATER, WESLEYAN UNIVERSITY, MIDDLETOWN, CONN.

Chemistry tells us that air is composed mainly of two gases, *Nitrogen* and *Oxygen*. Each of these, like the air which they together make, is colorless and invisible. We can not see them, yet we feel them in every breeze, we breathe them in every breath, without them we should die. Air has weight. The atmosphere presses down upon the earth with a force of about 15 lbs. per square inch, or nearly 5,000 tons per acre. Four-fifths of this weight is nitrogen and one-fifth oxygen. Over every acre of land, then, there are nearly 4,000 tons of nitrogen and 1,000 tons of oxygen. The oxygen is the active, and the nitrogen the inactive element of the air. To make a fire burn, we provide a supply of air. It is the oxygen that supports the combustion. Close the draft, and as soon as the oxygen is used up the fire goes out. Nitrogen remains, but it cannot sustain the flame. We breathe air to support life. Here again oxygen is the efficient agent. The nitrogen dilutes the oxygen. In an atmosphere of pure oxygen respiration would be too active, but in one of pure nitrogen we should suffocate. And if we are in a perfectly close room we speedily consume the oxygen, and unless fresh air with its oxygen were supplied we should die.

Where Nitrogen is Found.

Everywhere, then, where air is, there is nitrogen. Not only in the atmosphere as it surrounds the whole earth, but in the waters of springs, streams, and the ocean which dissolve air and hold it, and in the soil which the air likewise permeates, does the aerial nitrogen occur. But there is a great deal of nitrogen besides that in the air. Nitrogen forms a part of every plant, from the grass to the oak, and is in every organ, in root, stem, leaf, flower, fruit, and seed. It occurs in the body of every animal, and in every part of the body. Neither plants nor animals could live or even exist without it. It is an essential element of all our foods, and the costliest component of fertilizers. Its compounds are in earth, and air, and sea; in every fertile soil; indeed no soil could be fertile without them.

Free and Combined Nitrogen.

I have just spoken of compounds of nitrogen, and ought to explain the difference between nitrogen in the free or uncombined state, and in compounds. The nitrogen that makes up the bulk of the air, is in what chemists call the free state. The minute particles, atoms, as they are called, are not united to those of any other element, they exist by themselves. But they are capable of combining with other elements to form compounds. Thus an atom of nitrogen unites with three atoms of hydrogen to form a compound called ammonia, and two atoms of nitrogen combine with five atoms of oxygen to form a compound called nitric acid. So long as the nitrogen remains free, neither plants nor animals can make the most complete use of it, but in its compounds it can be directly used as food by both animals and plants. And the compounds of nitrogen are employed in a great variety of ways to supply the wants of man.

Compounds of Nitrogen.

The nitrogen compounds that are of most importance in daily life may be divided into three classes: Ammonia, Nitrates, and Organic Nitrogen Compounds.

AMMONIA.—We know very well the intensely pungent odor of ammonia water, "Spirits of Hartshorn." This is due to ammonia. Ammonia is, like nitrogen, a colorless, invisible gas. It is composed of two gases, nitrogen is one, the other is hydrogen, the gas which, combined with oxygen, forms water. Ammonia is formed when nitrogenous matters decay. We often find a strong smell of it in the stable and around the out-houses. Very minute quantities occur in the air, and we have it in concentrated forms, in smelling salts, Sal Ammoniac, and in Sulphate of Ammonia, which is so much used for a fertilizer.

NITRATES.—NITRIC ACIDS.—I have just said that two atoms of nitrogen may unite with five atoms of oxygen, and that the compound is called Nitric Acid. But the latest chemical theory requires that some water should be added to this to make the true nitric acid. This is in fact the case with the nitric acid which we buy of the apothecary as *aqua fortis*. If we take nitric acid and put soda with it, we get nitrate of soda, or soda saltpeter, as it is sometimes called. The nitrate of soda that is so much used for a fertilizer is an impure material brought by thousands of tons from Peru and Chili. Ordinary saltpeter, or "nitre," is a nitrate of potash, that is, it consists of nitric acid and potash. Nitric acid in the soil combines with lime, making nitrate of lime. In this form nitrogen is leached out of the soil by water, carried beyond the reach of the roots of the plants to streams and the sea, and thus the precious element is lost to vegetation. The loss of fertility which soils suffer by the washing away of nitrates is incalculable.

ORGANIC NITROGEN COMPOUNDS.—Nitrogen in ammonia, nitrates, and other forms, is gathered by plants from soil and air, and used by them as food. When it gets into the plants, it undergoes wonderful changes. It combines with other elements, carbon, oxygen, hydrogen, and so on, and these compounds are stored away in the different parts of the plant. Thus we have in wheat, the gluten, that boys like to chew in "wheat gum." There are a great many such compounds in plants. Many of them are eaten by animals and are stored away in their bodies. The lean meat, skin, and connective tissues of our bodies, the albumen, white, of eggs, and the casein or curd of milk are nitrogen compounds, and are formed from similar compounds in plants. Now, the gluten of wheat, the casein of milk, the albumen and the fibrin of meat, and so on, are called organic compounds, and their nitrogen is organic nitrogen.

The Nitrogen of the Atmosphere.

We have already learned that four-fifths of the air is nitrogen, in the free state. The atmosphere also contains combined nitrogen, ammonia, nitrates, etc., but the quantities are extremely minute. Rain, snow, and dew bring nitrogen compounds to the soil, but in quantities so small as to do but little toward enriching it. That is to say, the amount of ammonia and nitrates brought to the soil in this way in a year would be only a small part of what an ordinary crop would need, but in the course of a number of years quite a quantity might accumulate. Some chemists hold that the free nitrogen of the air is assimilated by the soil, but this is doubtful.

The Nitrogen of the Soil.

The nitrogen of the soil comes partly from the atmosphere and partly from vegetation, from the plants which have grown and been left to decay in it. The soil contains very little ammonia or nitrates. Nearly all its nitrogen is in the more complex form of organic nitrogen. But the nitrogen in the soil is undergoing continual change. The organic nitrogen is altered, by "nitrification," to nitric acid, and this nitric acid, unless seized upon by plants, is sooner or later carried away by water, and lost to vegetation.

Nitrogen in Fertilizers.

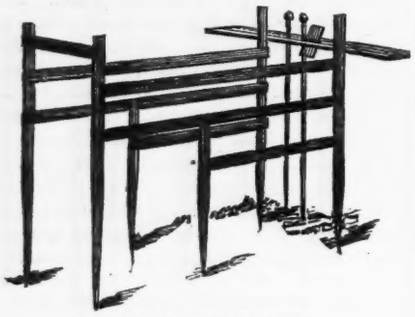
Natural manures, dung, urine, etc., contain scarcely any nitric acid, and but very little ammonia. Nearly all the nitrogen is in the form of organic nitrogen. It occurs as organic nitrogen likewise in most of the artificial fertilizers, as bone, dried blood, meat scrap, fish, leather-waste, and in the "ammoniated" phosphates, in which these are used to supply the nitrogen. Peruvian guano contains considerable ammonia, but the larger part of the nitrogen is in organic compounds. Indeed in all ordinary nitrogenous fertilizers, except nitrate of soda and sulphate of ammonia, the bulk of the nitrogen is organic nitrogen.

What Forms of Nitrogen do Plants Use for Food?

Plants can take their nitrogen as ammonia, as nitric acid, and as organic nitrogen. They seem to prefer nitrates and ammonia. The number of organic nitrogen compounds which they are able to digest, so to speak, is limited. Practically the larger part of the nitrogenous food of plants seems to consist of the nitric acid which their roots gather from the soil. This nitric acid is derived mostly from the decay of vegetable and animal remains in the soil, though part comes from the atmosphere in the forms of ammonia and nitric acid. The inert nitrogen compounds, which, until changed, are useless to the plant, are gradually altered by the process of nitrification above referred to, and finally reach the condition of ammonia and nitric acid, the forms which plants prefer. And not only is the vegetable matter of the soil thus worked over for the use of plants, but animal refuse, dung, guano, and the various materials used for fertilizers, including even ammonia, are transformed by nature in that wonderful laboratory which we call the soil, and made into the compounds best fitted for the plant.

A Nursing Pen for Sheep.

Mr. W. W. Wheeler, Arlington Hights, Cook Co., Ill., sends us a sketch of a pen for confining a sheep that will not own her lamb. The sheep is secured by two smooth stakes driven into the ground and brought sufficiently near together, and then fastened by a wedge in a cross-piece, as shown in the accompanying engraving. The framework which surrounds the sheep is of light material, and of the form shown above. The sheep can be prevented from lying down by putting a stick upon the top of the lower bar.



A PEN FOR A NURSING SHEEP.

Rotation of Crops and Manures.

BY DR. M. MILES, DIRECTOR OF EXPERIMENTS, "HOUGHTON FARM," ORANGE CO., N. Y.

In summing up the advantages of a systematic rotation of crops, the supply of manure that can be obtained in the residual produce of the feed provided for animals in the course of cropping, and the ultimate profits that may be derived from the manure when applied to the soil, must not escape attention, as they are matters of great practical importance. From the wide variations observed in the action of farmyard manures on different soils, we cannot decide upon any standard that will enable us to determine their absolute value, in promoting the growth of crops in any given case. For example, a dressing of manure on a heavy soil would not produce precisely the same results that would be obtained by the same manure on a light soil, and the different effects observed in the two cases would be still further complicated by variations arising from peculiarities of seasons. The direct method of experimentation for determining the absolute value of manures, which would at first sight be suggested, cannot, therefore, from the complex conditions involved, be applied with any prospect of success.

Fortunately, however, the results of carefully conducted feeding experiments, and particularly those made by Messrs. Lawes & Gilbert, at Rothamsted, enable us to calculate the quantity of each of the most valuable constituents of the manure obtained from a known amount of feed consumed by animals on the farm, and as the market value of these substances can be readily ascertained, the relative value of farmyard manures can be determined with sufficient accuracy for all practical purposes. This method of ascertaining the relative value of manures, is not, as many suppose, a purely theoretical process, but is based on the results of accurate and conclusive experiments.

Plants are composed of some fourteen different elements, that enter into their composition in various proportions, but as only three of them, viz., Potash, Phosphorus, and Nitrogen—are likely to be deficient in the supply of food furnished to plants in any ordinary soil, we need not concern ourselves with any other chemical elements in estimating the composition and relative value of farmyard manures. It may then be said that the value of manures depends, in the main, on the amount of Potash, Phosphoric Acid, and Nitrogen, they contain, in an available form for plant growth.

From the experiments referred to it has been ascertained that, on the average, less than ten per cent of the Nitrogen of concentrated foods like the grains, and rather more in the coarser products like straw, are retained by the animal in the peculiar work of its organization, and that the remaining nine-tenths appears in the manure. Of the Potash and Phosphoric Acid of the food, but a very small proportion is retained by the animal, and practically it may be said that it nearly all appears in the manure. Growing animals, or cows giving milk will of course retain a slightly larger proportion of these valuable constituents of the manure than store stock, but in estimating the relative value of manures, these slight variations may be safely neglected.

The following Table (1), showing the value of the manure produced by feeding one ton of the articles named, is based on their average composition as shown by analysis, after making liberal deductions for the amount of Potash, Phosphoric Acid, and Nitrogen retained by the average animals of the farm:

TABLE 1.

Kind of Feed.	*Value of manure from 1 ton of Feed.*	*Kind of Feed.*	*Value of manure from 1 ton of Feed.*
Indian Corn (35¼ bu.)	$6.96	Peas (31¼ bu.)	13.00
Corn Stalks	3.31	Pea Straw	4.56
Oats (62½ bu.)	6.98	Beans (31¼ bu.)	15.05
Oat Straw	2.24	Bean Straw	7.61
Wheat Straw	1.69	Turnips (34 bu.)	.95
Clover Hay	8.84	Turnip Tops	1.20
Timothy Hay	5.94		

About twenty years ago Dr. J. B. Lawes made a similar table of manure-values of cattle foods, which he republished with slight changes and additions in 1875. The values in the present table are generally lower than those given by Dr. Lawes in his revised table; but his values are for "long" tons, which are not used here, and I have perhaps allowed a slightly wider margin for nutritive materials retained by average farm stock, besides using a lower scale of prices. The claim of absolute accuracy is not made for the table, but it represents a close approximation to the average of results that may be accepted as sufficiently accurate for estimating relative values.

In using these data in relation to our present subject, it will be more convenient to compare the value of the manures produced per acre in different rotations. For this purpose Table 2 has been prepared, in which the value of the manure per acre in the crop itself has been calculated on an assumed yield of each crop, as stated in the first column:

TABLE 2—SHOWING VALUE OF MANURE PER ACRE.

Crop—Assumed Yield and Manure Value.			*Total Estimated Value of Manure for Crop of 1 Acre.*
Corn, 50 bu., value of manure	$9.37		
" Stalks, 2½ tons, " "	7.45	—	$16.82
Oats, 45 bu., " "	5.02		
" Straw, 1½ tons, " "	2.80	—	7.82
Wheat Straw, 1½ tons			2.11
Clover Hay, 2½ tons			19.89
Timothy Hay, 1½ tons			8.91
Peas, 25 bu., value of manure	$10.40		
" Straw, 1 ton, " "	4.56	—	14.96
Beans, 25 bu., " "	12.04		
" Straw, 1 ton, " "	7.61	—	19.65
Turnips, 600 bu., " "	17.10		
" Tops, 4 tons, " "	4.80	—	21.90

The table will show that the value of the manure made upon the farm will be largely influenced by the crops grown for cattle food.

In a former article we called attention to the influence of crops like peas, beans, and clover, upon the grain crops that immediately followed them. We found these leguminous crops, although freely using Nitrogen for their own growth, still left the soil in good condition for growing large crops of grain. But this is not the only advantage to be derived from these leguminous crops when raised and consumed on the farm, for we see from the above tables that their manure-value, when estimated either by the ton or per acre, is much above that of several other staple crops. Our Indian Corn, the king of cereals, stands high in the list in the production of manure per acre, and it is therefore, from this standpoint, of great value in keeping up the fertility of the farm. Its direct influence upon the soil, in its growth and development, has not as yet been determined. As a hoed or "cultivated" crop, it furnishes the opportunity for the profitable pulverization of the soil, and to that extent, at least, it is beneficial to the succeeding grain crops, but whether, like the leguminous crops, it improves the condition of the soil by making its constituents directly available for the growth of other cereals can only be answered by further investigations.

From the data furnished in Table 2, the value of the manure produced by different rotations can readily be compared, and the influence of any changes in a rotation upon the manure supply can be easily estimated. For example, let us see what the effect of replacing clover with Timothy, in a common five-crop American rotation, would have upon the supply of manure. The manure-values of the crops, as shown by the table, would, for each acre, be as follows:

1—Corn	$16.82	Corn	$16.82
2—Wheat	2.11	Wheat	2.11
3—Oats	7.82	Oats	7.82
4—Timothy	8.91	Clover	19.89
5—Timothy	8.91	Clover	19.89
Total	$44.57	Total	$66.53
Average	$8.91	Average	$13.31

In these rotations we have assumed that the wheat only was sold, and that all other crops were consumed on the farm. Allowing the same yield of crops in the two rotations, we find that the clover brings up the manure value of the rotation to an average of $13.31, while the rotation with the Timothy gives an average of but $8.91 per acre, a difference of $4.40 for each acre in the rotation in favor of the clover, or $440.00 on a 100-acre farm. The difference would, however, be greater than this, as the rotation with clover should give a greater yield of crops than the rotation with Timothy, for two reasons; 1st, from the influence of the clover upon the soil in its growth; and 2d, the larger supply of manure should give greater productiveness.

In using our table for comparing different rotations with reference to the value of manure produced, the one giving the lowest value would therefore have the advantage.

It will be readily seen from what has already been presented, that a variety of crops grown in succession will tend to economize the elements of fertility in the soil, so that the greatest aggregate return for natural productiveness, or for manures applied would be obtained; while the continuous growth of a single crop would result in the waste of some of the valuable constituents of the soil

which are not in a form available for it, but which could be made use of by other crops.

The Horse Shoe and Its Application.

BY D. D. SLADE, M. D., PROFESSOR OF AGRICULTURAL ZOÖLOGY, HARVARD UNIVERSITY.

In remarks upon the preparation of the horse's foot for the shoe, I have constantly endeavored to impress upon students and readers, the importance of the following axiom—never suffer the normal structures of the foot to undergo any mutilation. At the same time, I have insisted upon the necessity of bringing the foot to a proper level. Any excess of growth at the toe renders the pasterns more oblique, and, as a consequence, throws undue weight upon the "back sinews," whereas, too great hight of heels has a similar effect upon the joints of the extremities, by rendering them too upright. Taking as our guide the foot of the animal that has never been brought to the forge, and which, in consequence, must be considered as a correct model, let the external wall of the hoof be reduced by means of the rasp *to a level with the firm unpared sole.* If there is no growth of the external wall beyond this level, then there is nothing to be removed.

In the selection of a shoe for the healthy foot, we must bear in mind the object in view, which is to protect the parts from excessive wear. This protection is to be found in a metallic rim of proper size and shape, securely adjusted. Almost every shoe in common use meets this end more or less satisfactorily, and I have already remarked that the proper preparation of the foot that has been previously shod is of vastly more importance than the particular kind of shoe to be adopted. At the same time, there are faults in the shoe most commonly employed, which had their origin in its particular adaptation to the foot after this had undergone more or less severe mutilation at the hands of the farrier, and which have been retained more through custom, than through actual necessity, as we have reason to hope. The most prominent of these faults consists in extreme narrowness of rim with a concavity upon the upper or foot surface, in order to prevent the sole from sustaining least weight or pressure, which it is perfectly unfitted to do after being pared down to a point of sensitiveness. In a state of nature we know that every portion of the foot comes to the ground and sustains its share of weight, and in the shod state, it should do the same as far as practicable. Hence, the shoe should be constructed with its upper surface perfectly flat, and with a breadth sufficient to protect a portion of the sole, and to sustain weight. It should be bevelled upon the ground surface, in imitation of the concavity of the sole, and not upon its upper surface, where the space thus formed serves as a lodging place for small stones and other foreign bodies. In shape it should follow the exact outline of the outer wall, being narrowed at the heels, but continued of the same thickness throughout. The lateral projection at the quarters, and the posterior one at the heels are unsightly, of no benefit, and should never be allowed where speed is required.

One of the highest authorities says on this point:—"In fitting the shoe to the back part of the foot, let the smith take care that it is not longer or wider than the point where the crust and bars unite. An eighth of an inch may be allowed to project backwards beyond this point, but not more, but there should not be the slightest overlapping sideways." In fine, the shoe should be accurately fitted to the foot as previously prepared, and not the foot to the shoe.

The weight of the shoe is a matter of more consequence than is generally conceded, and this is shown by accurate statistics. It should under all circumstances be as light as is consistent with durability. The use of calkins is very objectionable, but as yet no other contrivances have answered the same purpose as well. They should never be employed, however, except when absolutely required, and then they should be of equal length at toe and heels, otherwise an unequal strain is thrown upon tendons and ligaments, terminating sooner or later in serious injury to the extremities. Clips are useful as a means of fastening the shoe more securely, and of diminishing the number of nails.

Whether the shoe should be fitted to the foot in a hot or cold condition, has called forth at times a vast amount of controversy. Experience has taught that the momentary application of the hot shoe can be of no detriment to the horny fibers, and that the more accurate adjustment thereby attained far outweighs any possible injury to the parts.

The number and disposition of the nails depend upon the kind of shoe. For speed and light draft, from five to seven may be employed, while for heavy horses and for heavy draft the number may be increased. Where few nails are used they should be more widely distributed than is usually the custom. When it is remembered that the introduction of every nail is so much injury to the structures of the foot, it will readily be seen that the smaller the number requisite for the purpose the better for the animal. In driving the nails, it is essential that a thick short hold of the crust should be had, rather than a long thin one. Not only is the shoe thus held more firmly, but there is a probability that the nail holes may, by the downward growth of the horn, be removed at the next shoeing, which in most cases should not exceed an interval of four or five weeks. The points of the nails should be shortened to just that length which will permit them to be turned over and hammered down smoothly, with perhaps the least possible rasping. The common method of rasping notches for the extremities of the nails is not advisable. In fact, as I have already said, the rasp should never be used upon the external walls of the hoof except in cases of absolutely necessity to prevent striking of the opposite limb. Its use destroys the natural polish, exposes parts beneath which are not fitted for such exposure, and renders the horn brittle, and liable at any moment to quarter cracks and other maladies.

There are various forms of shoe adapted to abnormal conditions of the foot. Of these I will refer only to the Bar-shoe, as being extremely useful where dressings are to be retained upon the sole, as in the case of wounds or pricks, or where it is desirable to give strength to weak or injured heels, or to bring more direct pressure upon the frog.

The general management of the foot calls for a few words. The hoof should be washed daily in cold water by means of a sponge, and care taken to remove any foreign bodies which may have insinuated themselves beneath the shoe or into the clefts of sole or frog. No oil or blacking can supply the place of the beautiful natural polish of the unrasped crust, and no "stopping" of clay, corroding, or other mixture, can serve as a substitute for the unpared sole. Let no false notions of economy induce the employment of the smith whose only or chief recommendation is that his shoes remain secure upon the foot longer than those of his competitor. Let the shoes be removed, as a general rule every month, the foot brought by the rasp to the natural level, no paring of the sole or frog, no rasping of the crust, or opening up the heels allowed; a well fitting shoe adjusted as I have laid down, and the healthy foot will be preserved in a sound condition, and one already suffering from mismanagement, will have the best chances for recovery.

A Feed Coop for Chickens.

Mr. W. A. Hister, Clark Co., Ind., sends a brief description, with sketches, of a pen in which to feed small chickens. It consists of 8 horizontal cross-pieces or "nailers," and 50 palings or pickets. The end cross-pieces are

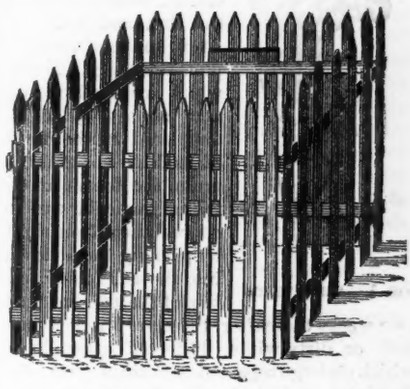


Fig. 1.—A CHICKEN PEN.

4 feet long, and those at the sides 7 feet, and are made of strips of boards 3 inches wide and 1 inch thick. The pickets are of thin oak, and were taken from an old fence. Two cleats are tacked on each of the cross-pieces, one on one side of the end, and the other on the opposite side, 2½ inches from the end. The cleats are 1 inch square, and extend 3 inches downward on the short cross-pieces, and the same distance upward on the long ones. The pickets are laid on the short cross-pieces so that the latter are 30 inches apart, and the lower 12 inches from the ground; the long cross-pieces are the same distance apart, but the lower is 9 inches from the ground. A door may be made in one side, and so arranged as to fasten with a button, and can be easily lifted off when desired.—The feed-coop, as completed, is shown in figure 1, and the method of arranging the cleats upon the ends of the cross-pieces may be seen in figure 2.

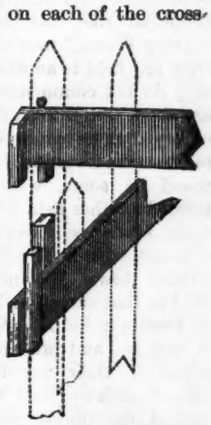


Fig. 2.—ARRANGEMENT OF THE CORNERS.

The Army Worm.

BY PROF. CYRUS THOMAS, CARBONDALE, ILL.

The appearance of the Army Worm in the region of Southern New York, in 1880, and in some portions of the Northwest in 1881, has again called special attention to it, and has induced entomologists to renew their study of its history and habits with a view of determining, if possible, some points that have hitherto remained in doubt. It is generally known to the readers of the *American Agriculturist*, that these "worms," one of which is shown in figure 1, after they have completed their term of life in this state, descend a few inches into the ground, and, having formed a kind of cell, are changed into shining chestnut-red, or mahogany-colored pupæ, or chrysalides of the form represented in figure 2. These chrysalides are ultimately transformed into dark fawn-colored or pale-brown moths, similar to figure 3.

The life history of the species, or the cycle of changes it undergoes, as observed in the latitude of Southern Illinois, may be briefly stated as follows: The moths make their appearance early in the spring, usually between the first and tenth of April, and soon after deposit their eggs. These, which are small, white, and almost spherical, are placed in the folds of the leaves of grass or grain, the female moth taking particular care to conceal them from sight by pushing them down into the still folded portion of the leaf. In about two weeks thereafter, these are hatched into dull or dirty-white, 16-footed caterpillars, which undergo repeated moultings, gradually acquiring their dark, striped color. In their normal condition, they are true cut-worms, living out this stage of their existence, concealed under the grass, cutting it off just at the surface of the ground. When they become excessively multiplied, they assume an abnormal role, becoming a marching or "Army Worm," moving in immense bodies from one field to another. As a general rule, they do not commence marching until they are about two-thirds grown. So far as I have observed, those leaving one field always march in the same direction, but not always, as supposed by some, with unfailing certainty toward another field in which there is proper food. I have seen them leave a meadow in a direct line toward town, the nearest field in that direction being at least a mile off. While it may be, and probably is, true, that the cause of their marching is, as a general rule, to seek for food, there are certainly repeated exceptions, where they have been known to leave an ample supply. It is also true that they will march occasionally when not in excessive numbers. I observed an instance of this kind in 1875, where a little straggling "army" left a fine grassy yard, and marched over ground partly denuded, where they were exposed to the hot rays of the sun which they so much dread, a large number of them perishing by the way. This movement was certainly the result of some other impelling cause than the want of food.

Fig. 1.—ARMY WORM.

Fig. 2. THE CHRYSALIS.

The habits of the "worms" are somewhat similar to those of ordinary cut-worms, as they avoid the hot sun, coming forth to feed chiefly in the night, or during cloudy weather. They hide under clods, stones, and other rubbish during the hot and sunny portion of the day. During their life in the larval state, which lasts about a month, the "worms" change their skin five times; and having completed their growth, descend into the ground a few inches below the surface, where they transform into pupæ. They spin no cocoon, but by movements of the body and excretions of a sticky fluid, usually form a kind of earthen cell; but occasionally they simply crawl into some hiding place to undergo their changes. About fifteen or twenty days after entering the ground they reappear as moths, coming out usually about dusk, and climbing up the grass stems where they rest awhile for their wings to dry. In about two weeks after this the females commence depositing their eggs. From personal observations, and all the data I have been able to obtain, it is found that the term of life of the individuals in their natural conditions, from the time the egg is deposited until the resulting moth deposits eggs, is, on an average, about 77 days: egg, 14; larva, 30; pupa, 17; moth, until the female deposits, 16 days.

Fig. 3.—THE MOTH, NATURAL SIZE.

The second brood of moths usually appears, in this region, in the latter part of June. Their history during the remainder of the year, in their natural conditions, is not so thoroughly known as that during the first half. By a wise provision of nature, it is so managed that an excessive multiplication of the species necessarily exposes them to view, and thereby brings upon them an excessive nnmber of parasitic insects. The consequence is that a numerous second brood of "worms" is an anomaly. I have observed but one fall "army" during thirty years' observations, and know of only two well attested cases of the kind in this immediate section in that time.

That the species is two-brooded here we know from direct observations; and that the pupæ of the second brood occasionally develop into moths, in the fall, is also an established fact, but all the data obtainable show that this is the exception and not the rule; and that on the contrary the mass, in fact, nearly all of the pupæ of this second brood remain in this state over the winter, coming out as moths about the first of April. Some experiments made, and others now being made, indicate that in confinement the moths of the second brood usually hatch out, whereas, in their natural condition, the rule is just the reverse, as above stated. While the proof is conclusive that in this locality they hibernate in the pupa state, there are strong reasons for believing that a different rule prevails in the extreme northern part of this State, and also in New York. The determination of this point for the different localities is of some importance, as on it depends, to a certain degree, the value of some proposed remedies.

One important fact in reference to their development is, that they do not appear in excessive numbers except in a spring following a dry season. This is important, because it enables the farmers to predict when it *will not* appear, though they may not be able to tell beforehand when it *will*.

Experience since 1844 appears to *demonstrate conclusively* that another requisite, at least in this section, is, that the spring in which they appear shall be damp, or at least cloudy and rather cool. The year, on the whole, may be more than ordinarily dry and warm, but the spring must be damp and cool in the localities where they appear. But few if any exceptions can be found to this rule; in fact hot, dry weather will soon cause them to disappear. It is a fact worthy of notice, that in Illinois the Army Worm has appeared in the spring following each Chinch-bug year.

Remedies and Precautionary Measures.

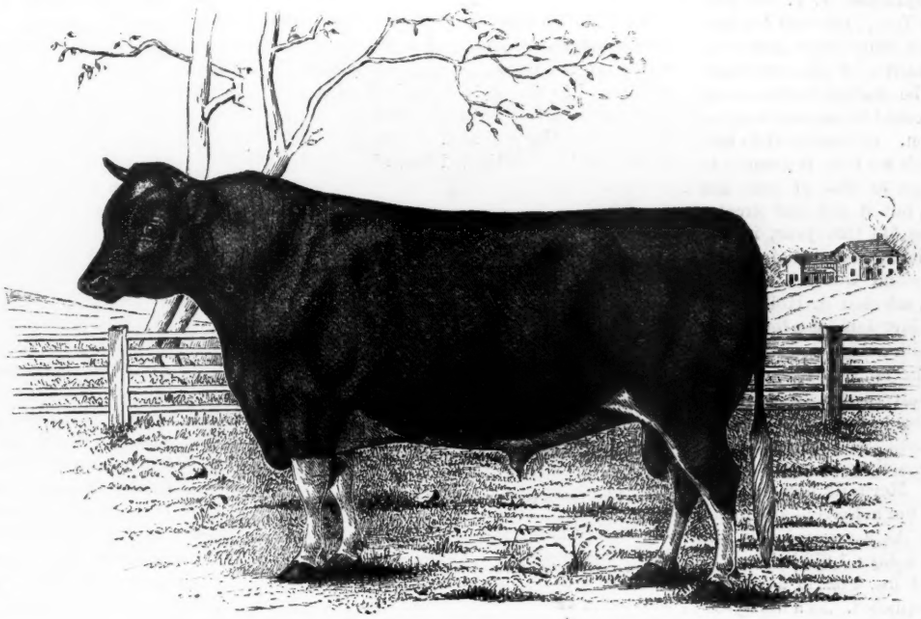
That it is possible to protect a field from a marching army of worms by ditching, is a well-kown fact. Planks placed on edge and fitted end to end, smeared on the upper edge with coal tar or kerosene, is another method which has been adopted in some cases with success; placing lines of coal tar across their pathway has been tried, but they soon cover this and pass over it. Sprinkling the grass in front of them with water mixed with Paris Green and London Purple has, it is said, proved successful in checking their march; but the use of such poisonous substances in such places cannot be justified and should never be adopted. Where the worms have obtained possession of a field, and spread themselves over it, there is no practical way of destroying them, and at the same time saving the crop. Topical applications, such as solutions, powders, etc., are utterly useless and a waste of time and money, except so far, only, as they act as fertilizers. Running heavy rollers of stone or iron over the field has been suggested, but the objections to this plan are, that comparatively few farmers are supplied with such rollers, and that only a portion of the "worms" are destroyed by this means. Where it is very desirable to preserve the meadow so far as possible, this plan is worthy of adption by all who may be prepared for it. Burning over the meadows in the winter or early spring has proved, in some instances, an effectual remedy in this latitude, probably because it destroys the old grass in which they prefer to deposit their eggs. The chief objection to this remedy is that it requires the burning to be done every year, unless some means of knowing beforehand when the insects will come can be ascertained. As we already know that they only come after a dry fall or summer, this will limit the use of this precautionary measure to the winter following such seasons.

My own opinion is, that if the "worms" are very numerous in a meadow, the best thing that can be done is, to turn them under with the plow as deeply as possible, and plant the ground in some crop that can be matured in the season, and that is applicable. If the meadow is new, and it is very desirable to preserve it for the next year, the farmer must then turn in hogs, etc., use the roller, or adopt such device as may be most convenient so as to make the injury as light as possible, but with no idea of saving the present crop.

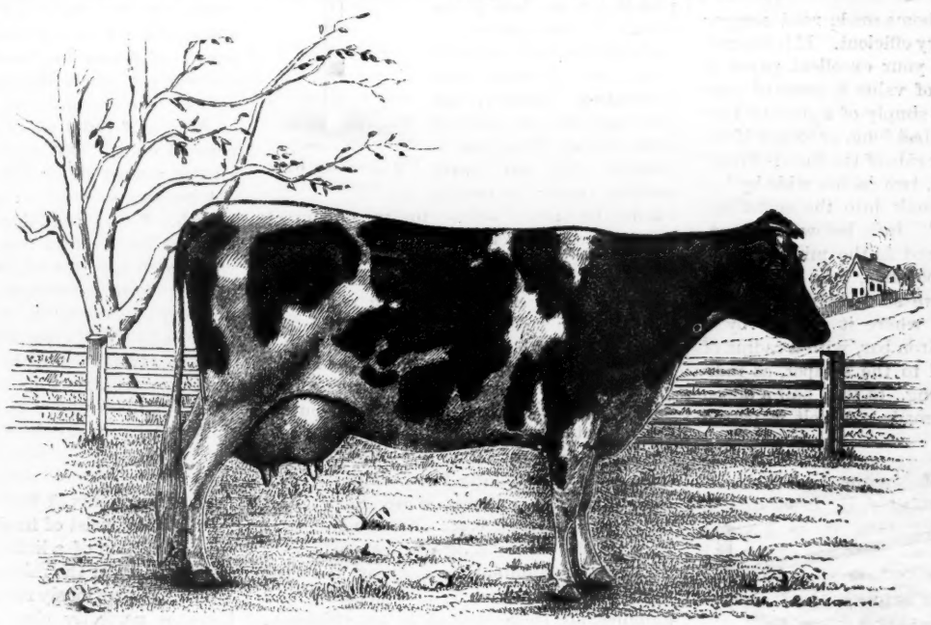
The Cattle of Holland.

The Dutch farmers have long been famous as butter and cheese-makers, and the dairy cattle of Holland—especially of North Holland and Friesland—have been regarded on the continent of Europe as the best dairy cattle of the world. They have been carefully bred according to practical rules—not according to our English or Anglo-American ideas altogether—but so that we have a remarkable result before us, in the best breed of Dutch cattle of the present day. The cows are black and white, of the largest size, "big as Shorthorns," and admirably well formed as milk producers. The Dutch cow usually has a capacious paunch, a large udder and teats, great branching, tortuous milk-veins, an "escutcheon" of the most favorable promise, and a general preponderance of the digestive and lactiferous parts over the other portions of the body. Their milk is moderately rich, yielding excellent butter, but while this has not so positive and delicious a flavor, nor such good color as that of the Channel Island cows, yet it is firm, and has the reputation of keeping better than the butter of any other of the pure breeds. For cheese making, however, the milk has no superior. This is supposed to be owing to the fact that the butter globules are, though not large, of a very uniform size, and are easily mixed thoroughly with the milk before and at the time of coagulation, or curd-forming. This gives the cheese a uniformity of richness in all its parts, which is inherent in the intimate texture of the curd, and which does not depend upon subsequent mixture. Like other large breeds, these cows require abundant feed, gently rolling or level land, and do best on rich alluvial meadows like those of their native "Hollowland," as Waring calls it. In this respect they are like the Shorthorns, with which noted race one has a natural inclination to compare them.

When first introduced into this country by Winthrop W. Chenery, Esq., of Boston, thirty odd years ago, the Dutch cattle were seen more or less at the fairs, and compared unfavorably, to our unschooled eyes, with the trim beef-bearing Shorthorns. They were called "big-framed," "bony," "coarse brutes," "elephantine," and all that—admitted, however, to be great milk-producers. Since that time these cattle have not changed, but our ideas have. We see their extraordinary adaptation to the dairy, and even Shorthorn breeders acknowledge that their favorite breed, always vaunted as great milkers, as a race cannot compare with them in this respect, while as beef animals the cattle of Holland fatten quickly and make excellent beef, which is really all that a dairyman needs to know. They are not, and never will be, raised exclusively for beef as the Shorthorns are, and their whole build and "make up" contrasts, as it should, strongly with any beef-making race. Viewed from a beef-breeder's standpoint, the cows are not symmetrical, but the dairyman *demands* this lack of symmetry, and it fills his eye just in proportion as it promises to fill his pails. He looks for excessive development of the "business end" in his cow, just as much as the beef-breeder looks for thickness of meat over the ribs and loin, and for full crops and close twists. A milk cow must have udder and teats, and milk-veins, and escutcheon. See the accompanying engraving. She must have also a good head, mouth, and teeth, and a capacious paunch. Whatever else she has are of secondary interest, and may be said to be of little account, provided they are of useful proportions and adapted to her needs. A soft, unctuous hide is indication of health, a good coat is a protection against vicissitudes of weather; her feet and legs must be capable of sustaining her weight without fatigue, and of good form, not too large and bony. Everything which is of secondary importance may be reduced in the development of the milch cow to its smallest useful size. When this occurs we have the true *wedge shape* of the perfect milch cow—remarkably seen in the Dutch cow, and really characteristic of the Holstein breed, as it is also of the Ayrshires, and of other great milking races. It was a surprise to Mr. Chenery to find that cattle breeders in this country knew absolutely nothing about these fine cattle, and so to hide their origin he gave them a "trade name" which it seems absolutely discreditable to American intelligence to continue to use. Dutch they are, Friesian they may be. What they are called at home, except "good cows," we do not know, but we do know that they did not come from



THE FIRST PRIZE HOLSTEIN BULL "UNCLE TOM."



THE FIRST PRIZE HOLSTEIN COW "NETHERLAND QUEEN."

Holstein, nor Schleswig, nor from any other part of Denmark or Germany. They have been largely imported of late years—are becoming every year more widely known and valued.

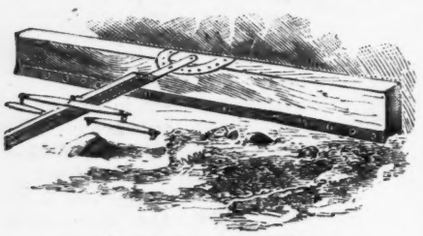
We present with this article typical forms of both sexes of these cattle, from one of the best herds in the country—that of Messrs. Smiths & Powell, of Syracuse, N. Y. The fact that the bull, "Uncle Tom," has won the first prize at the New York State Show four consecutive years, is evidence of his excellence which can hardly be gainsaid, for at no show in this country could he meet so large or so worthy competition. He was bred in this country besides, which we hold is greatly to his credit, as well as to that of both his breeder and owners, but it is a still greater merit to stand, as he did this year, in the midst of his prize-winning offspring.

The cow, "Netherland Queen," was imported as a yearling, selected in Holland by her present owners. Her dam, as a four-year-old, gave 74 lbs. of milk a day on grass alone. As a yearling, "Netherland Queen" won 1st at Elmira, at the State Show, in 1879; the next year first at Utica; then in the Mature Class, 2d at Albany, and this year, at Elmira, she took again the queenly position, winning 1st in a strong ring. Her milk record is certainly worthy that of her achievements in the prize ring, namely: As a two-year-old she gave 58 lbs. 12 oz. in a day; 1,670 lbs. 9 oz. in a month; and 13,574 lbs. 3 oz. in a year—a record said to be unequalled. As a four-year-old she has given 76 lbs. in a day, and 2,132 lbs. 6 oz. in a month; and from May 19th to September 19th this year she gave 7,271 lbs. 6 oz., and this record will doubtless be increased yearly until she is seven years old.

A Texan Road Scraper.

BY C. C. GEORGESON, PROFESSOR OF AGRICULTURE, COLLEGE STATION, TEXAS.

I have found the home-made road scraper here represented very efficient. If it has not been illustrated in your excellent paper, it may perhaps prove of value to some of your readers. It consists simply of a piece of 4 by 8-inch scantling, 10 feet long, or longer if desired. On the lower side of the face is firmly bolted a bar of iron, two inches wide by 1/4-inch thick. It is sunk into the scantling, and should project 1/4 inch below the wood. The tongue is fastened in the middle of the scraper, on the upper side, by a bolt, about which it can revolve so as to be placed at any desired angle, where it is held by a stout semi-circular iron bar, with a radius of about a foot, bolted to the scraper, as indicated in the engraving. In this, half a dozen or more holes are made. A bolt is passed



A HOME-MADE ROAD SCRAPER.

through a corresponding hole in the tongue into the holes in the bar, and thus holds the tongue firmly in position. The driver stands on the scraper when used, and by balancing his weight from place to place, as needed by the inequalities of the ground, the implement will do good work. On very hard and gravelly roads the bar on the face should be of steel instead of iron. The scraper complete can be made here, in Texas, for about $2.50.

A Double Spring Latch Gate.

Mr. F. B. Lindsay, Nicholas Co., Ky., sends sketches and description of a gate latch, and writes as follows: "A latch lever, *a*, fig. 1, is fastened to the gate by a bolt at *g*. By pressing back this lever the latch, *b*, is withdrawn from the post at *e*. A spring of hickory or locust is so adjusted that when the hand

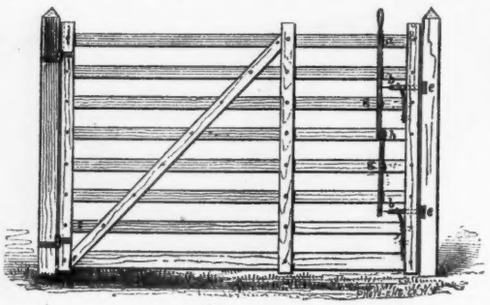


Fig. 1.—A GATE WITH A DOUBLE SPRING LATCH.

is removed from the lever it will return to its former position. At the same time that the lever *a* is drawn back, its lower end moves forward, and in doing this the latter presses against the upper end, *h*, of a similar lever *g*, which causes the lower latch to be withdrawn from the socket in the post. The inner face of the post is shown in figure 2. The latches are pieces of iron 6 or 8 inches in length, having a small hole in one end through which a wire passes to fasten it to the lever. The sockets in the post (fig. 2), are iron plates with holes the size of the end of the catches, screwed to the post; the outer edges protruding slightly, are bent back like the catch of a door lock. This gate is difficult for any farm stock to open; in fact, it cannot be opened unless the upper end of the lever *a* is struck in the right direction.

Fig. 2.—POST WITH SOCKETS.

The Butter Globule.

BY HON. X. A. WILLARD, LITTLE FALLS, N. Y.

The interesting article on "Artificial Milk," by Prof. Storer, in the *American Agriculturist* for November, touches a long disputed, and as yet unsettled question, in regard to the Butter Globule. The composition of fresh milk of average quality from common cows may be given as follows: Water, 87.40; Butter, 3.43; Caseine, 3.12; Milk-Sugar, 5.12; Mineral Matter (ash), .93—in 100 parts. On microscopic examination it appears as a clear fluid in which fat globules, the so-called milk globules, are suspended as in an emulsion. These fat globules are of different sizes in the milk of different animals, and even of animals of the same kind; they vary in diameter from 1/2000 to 1/4000 part of an inch. The question concerning which there has been a difference of opinion among chemists, is, whether these small globules of fat are enclosed in cells, with an investing membrane of either Caseine or some albuminous substance, the composition of which has not yet been defined. Or, on the other hand, whether this fatty matter is in a free condition, as in a simple emulsion? The former, which may be designated here as the "membrane theory," has been generally accepted by writers on the dairy, and upon this theory the philosophy of churning has been built up—that is to say, the albuminous covering of the globule must be broken for the fat to escape before butter can be formed. Lehman held that the nitrogenous substance, which we call Caseine, occurs in milk for the most part in a state of solution, but a not inconsiderable portion forms the free investing membrane or wall of the milk globules. Simon believed he had detected fragments of these membranes in milk which had been evaporated and treated with ether. Henle was the first to demonstrate its existence. On examining, under the microscope, the gradual action of Acetic Acid on the milk globules, he noticed a decided distortion of this membrane. Mitscherlich, on shaking perfectly fresh milk with Ether, found it scarcely at all changed, the Ether merely taking up a little fat. It was argued, therefore, if the milk were a simple emulsion, it would yield all its fat to the Ether, and would be converted into a transparent, tolerably clear fluid. As this is not the case, the separate fat vesicles must be surrounded by an insoluble substance. If now we add a substance capable of dissolving these membranes, Ether, when shaken with milk, will act on it precisely as on an emulsion—that is to say, it will take up the fatty matters; and, indeed, this is the case if a little Caustic or Carbonated Alkali be added to the milk before it is shaken with Ether. Lehman observed the following facts: On placing under the microscope milk shaken with Ether, but to which no Potash had been added, the surface of the milk globules appeared of diminished transparency, opaque, and fissured—the wall presenting the appearance of being coagulated. When Phosphate of Soda and Sulphate of Soda were used in place of Potash, milk treated with the former yielded almost all its fat to Ether; but did not become so clear as when treated with Potash. Under the microscope the aqueous fluid exhibited only a few fat globules, which were no longer round, but corrugated of a caudate form. Sulphate of Soda has the property of causing the capsules of the milk globules to burst, after which the fat can be extracted from the milk by Ether. The watery fluid, however, remains very turbid, but no longer exhibits under the microscope either milk globules or shreds of destroyed capsules, but only extremely minute, scarcely insoluble granules, which are unquestionably, he thinks, fragments of the destroyed capsules, and do not consist of finely comminuted fat; for on addition of a little Potash they do not disappear under the microscope, but the fluid which had previously retained its milky color becomes perfectly clear and limpid. The above is Lehman's chief argument in favor of the membrane theory.

Again, an American dairy writer pretends to have seen, under the microscope, these fat globules with the membrane torn, and the jagged, broken, part hanging down like a flap on one side of the globule; he also claims to have seen globules with investing mem-

branes filled with *water* instead of fat. It may be remarked, however, in this connection, that persons who have had but slight experience in the use of the microscope are often misled in what they see. Such observations, therefore, may need confirmation from the trained scientist before being accepted.

Now, on the other hand, without referring to the arguments of those who have from time to time taken exception to the "membrane theory," it will suffice to quote briefly from Prof. Storer's article. He says, "Dubrunfaut found, in fact, that almost any kind of fat taken in the fluid state, could be emulsified in water that had been made slightly alkaline with Carbonate of Soda, so as to imitate the serum of fresh milk. When viewed under the microscope, the globules of fat suspended in this way had the same general appearance as the fat globules in normal milk, and they were of variable size like the latter. On using a somewhat stronger alkaline liquid, the result was still more striking, and the emulsified fat behaved very much like milk. On allowing the liquid to stand at rest, a creamy layer rose on its surface."

This principle, as opposed to the "membrane theory," has been somewhat exemplified in the recent introduction of machinery for manipulating lard, so it can be used as a substitute for butter in skim-milk cheese. The melted lard and warm skimmed milk are passed together through a machine having a cylinder set with iron pegs, and revolving with great rapidity. By this means the lard is divided up into minute particles, which appear to be held firmly in suspension by the adhesion of the milk, similar to the original butter globules. The mixture is discharged in the form of thin cream, and is then mingled through the mass of skimmed milk in the vats, and then made into cheese. Before the invention of this machine, it was found difficult to distribute the fat evenly and minutely throughout the skim-milk, the larger granules of fat being liable to be discovered in the matured cheese.

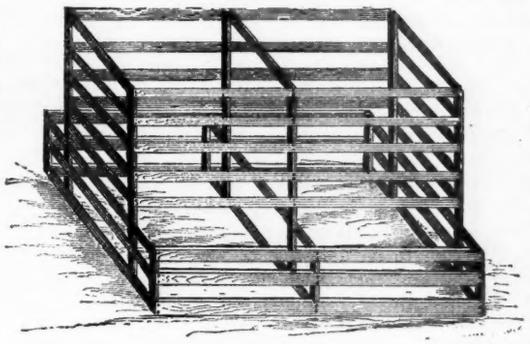
Again, in the churning of oleomargarine with milk, or buttermilk, to give a more pronounced butter flavor, the particles of fat coalesce. There is no abrasion or breaking of "cell-skins," and yet an artificial butter is evolved, often so nearly resembling genuine butter as to be scarcely distinguishable from it by good judges.

Is there not reasonable ground, then, for suspecting that the older chemists may have been mistaken in regard to the "membrane theory" of the butter globule, and is not the simple emulsion of fat in the milk more in accordance with the simplicity of nature's laws than a complicated covering of the fat globule with a substance, the composition of which the chemists have been unable to define? May not the simple adhesion of the liquid to the fat globules have been mistaken for the investing membrane? This is the question which yet remains to be settled.

Pecan Sprouts.—"J. L. W.," Robertson Co., Texas, is greatly annoyed by the springing up of Pecan sprouts in an old valley field. Though he cuts them every year, they increase rather than diminish, sometimes growing as large as one's wrist in one year. Can any one suggest anything better than to cut the sprouts while still green and growing? Please let us hear from some of our Texan friends who have had experience.

A Large Feed Rack.

Mr. P. W. Fuller, Brown Co., Kansas, has a large rack which he finds convenient for feeding hay or straw to stock. The width of the rack is 7 feet, but it can be any length desired (Mr. F.'s is 14 feet); hight, 10 feet; hight of manger, $2^1/_2$ feet; width, $1^1/_2$ foot. Cattle can eat from both sides. The advantage of such a rack, shown in the accompanying engraving, is that it will hold a large quantity of feed, and so securely that very little can be wasted by the feeding animals.



A LARGE, YARD FODDER RACK.

An Improved Field.

BY J. M. HUBBARD, MIDDLETOWN, CONN.

The field is shown with sufficiant accuracy in the accompanying diagram. It contains between five and six acres, is bounded on the north and east by highways, on the south by land of a neighbor, and on the west by land within the same enclosure, but differently conditioned and requiring different treatment. The surface descends slightly from south to north, and more considerably—perhaps one foot in twenty—from east to west. This field is, in fact, a section of the bench or second bottom lying between the low level land on the west and a range of hills which rise immediately across the highway on the east. It is favorably situated for cultivation, and the quality of the soil is naturally good.

The irregular line within the drained field encloses a tract where the water which oozes from under the hill on the east finds its way to the surface. This tract was not so wet that it could not be mowed with a machine in an ordinary season, and sometimes its borders might be encroached upon by the operations of tillage. The dotted straight lines show, in connection with the outlines of the field, those portions of it which were from time to time cultivated previous to the improvement. Each one of them, as will be seen, included some portion of the wet land. The other alternative was to make them considerably smaller, and this was chosen as the least of two evils. Nevertheless it was an evil, and sometimes a serious one. The operations of seeding and culture were not unfrequently delayed and thrown out of season thereby to the injury of the crop and the enhancement of its cost. But I need not enlarge upon the disadvantages of such fields. Most farmers know the story only too well. The straight continuous lines within the field show approximately the location of the tile drains laid a year ago last spring to carry off the surplus water from this tract. The arrangement of mains and branches is a very simple one, but the location of each and all was not determined without considerable study. After establishing the outlet the main drain was placed as far up the slope as possible, and still cut the water bearing strata at the lowest point of its undulations, so that no water should pass underneath and find its way to the surface of the field lower down. Then by means of branches, located wherever necessary, it was sought to gather all the water which would naturally come to the surface higher up.

These branches were placed just where they were thought to be needed, with no care to make them parallel or equidistant. Both the main drain and branches have done their work well. A crop of corn and one of tobacco have since been taken from this portion of the field, and in only one point, and that easily remedied, has the drainage proved insufficient.

I am led by observation to think that the condition of this field before draining illustrates fairly that of many fields now in need of like improvement The trouble with such fields is not merely that the wet spot is itself unfitted for cultivation, but that its presence obstructs the operations of culture upon all other portions of the field, and it thus depreciates the value of every acre the field contains. In years gone by when the hand hoe was, after the plow and harrow, the principal implement of tillage, such an obstruction was of less consequence. But now that horse-power and the implements adapted thereto have almost wholly superseded handwork in field culture, we can no longer tolerate, as we once did, obstructed, irregular, or diminutive, fields. So it comes about that the question of draining that wet spot presses with a new urgency. The man who feels this pressure is the one whom I hope to help in some degree by the suggestions of this article. Underdraining may be new to him, and may seem to be difficult and almost mysterious; but if he has fairly good powers of observation and reflection, and will apply them to the case in hand, its difficulties will vanish before him. The

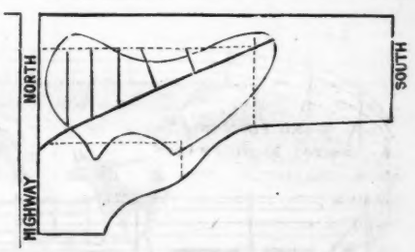


DIAGRAM OF AN IMPROVED FIELD.

initial point of such a work is the outlet, and generally the lowest point from which the water can escape freely is the best. The next question is one of grade, and unless the surface is very nearly level, the action of surface water will indicate this with sufficient accuracy. Water will not run up hill, but it will run down, though the descent be but slight. For a guide in grading the bottom of the ditch there is nothing better than running water, and if necessary I would do the work in the wettest season of the year in order to make use of it. When it runs with steady uniform current in the bottom of the ditch, the tile may be put down fearlessly. In all

but the very simplest cases, a main drain to carry off the water and branches to collect it, will be found necessary. The main may be made to gather where it can, but its other function as a carrier must control its location. For the location of the branches, I know of no better rule than to aim them straight as practicable at the source of the water they are to collect. All this will not come clear at first thought. One must study his problem until he understands it. Sometimes a little experimental digging will prove helpful. A few holes dug three or four feet deep at different points may reveal much of the underground movement of water to which the system of drains should be adapted. Such a piece of work well done is a source of great satisfaction as well as a matter of pecuniary profit. A sense of release, a feeling of victory comes rightfully to one who has conquered such an obstacle and freed himself from such a fretting hindrance. And I believe that in a pecuniary point of view the results of such work are more favorable than ordinary estimates would show. Or, to look at the matter from the other side, I believe that the existence of a miry, saturated tract even of small extent in a cultivated field, is a far greater evil than is generally supposed. Wherever a farmer has one, my advice would be to first find out just what needs doing, and then, like Grant at Donelson, move immediately upon its works.

Portable or Temporary Iron Wire Fences.

Portable fences, for the purpose of making temporary inclosures for animals, are much more employed than formerly, and we have given in former volumes various plans for constructing them of wood. In France such fences are made of iron wire, or bands of iron, and a recent *Journal d'Agriculture Pratique*, gives engravings of two forms that have been exhibited at the fairs this year. Fig. 1 shows an inclosure made with iron wire; the posts are also of iron, said to be constructed with special reference to lightness, though no details are given. Each post has a plate cast upon its lower end; this is placed about 18 inches below the surface, and covered with successive layers of dry soil,

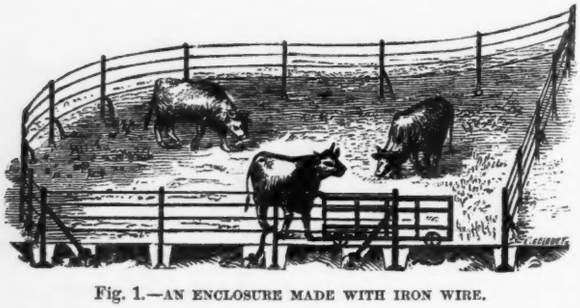


Fig. 1.—AN ENCLOSURE MADE WITH IRON WIRE.

each of which is pounded down solidly. The front edge of the engraving shows the holes in section with the plates at the lower ends of the posts. This method of setting the posts is said to give them great firmness, and the wire, plain or barbed, as may be preferred, is stretched in the usual manner. Instead of a simple wire, a wire cord, made by twisting together several small wires, is used throughout, or for the top of the fence only on account of its greater strength and flexibility. Such a fence may have its position changed in a short time, and when used by tenants is readily moved to another farm. The inclosure shown in figure 2 has its supports furnished at the base with an inverted cone, and are driven into the ground; according to the description the supports are placed between four or five feet apart, with strips of sheet iron between them, the width of which is not stated. These strips are used instead of wire, as they present a more visible obstacle to the animals. This end can, however, be accomplished with a wire fence, by the use of a single strip of light wood in place of one strand of wire. We give these examples of what has been done in France, rather as suggestions than as patterns to be followed, as we have no doubt some of our ingenious farmers will be able to greatly simplify the construction of portable fences in whole or in part of wire.

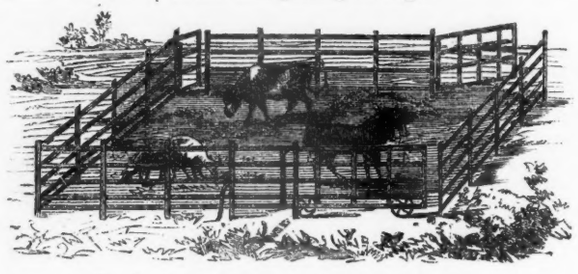


Fig. 2.—AN ENCLOSURE OF SHEET IRON STRIPS.

Artificial Incubation.

BY MASON C. WELD.

My experience with Artificial Incubation is not so great that I write with the authority of "One who knows"—and yet I do know a thing or two, which I have no doubt may prove of use to some of the readers of the *American Agriculturist*.

Care of Early Chickens.

We want early chickens—even chickens hatched in January are welcome if we can take care of them. I was shown, a few days ago, an inquiry by a reader of the *American Agriculturist*, in which the writer asked if chickens could be raised upon a board floor. I presume the writer had attempted to take care of very early chicks, and had let them run in a room with a board floor. He probably found that they became diseased in their feet—the toes curling under—or were crippled in some other way. Chicks seem to need either to run upon the bare ground, or to have sand and gravel an inch or two deep to run over and scratch in. This may be provided upon a board floor, and it is all the better if it be rather moist for a few feet around the water "fountain." I may seem to some to be taking care of my chicks before they are hatched, but I can assure young poultry raisers that the ability to take good care of the chicks is much more important than to get them well hatched out. The nursery may be subject to great fluctuations of temperature. If the chicks have one or more artificial mothers, or brooding boxes to keep warm in, or if there be a fair proportion of chickens six weeks old or older, the hatchlings will not suffer even if the thermometer drops to freezing or below by night, while by day it may rise to 100° in the sun and no harm will be done. I think such variations of temperature rather beneficial.

Of Incubators.

The best need watching, and I would say, let no one attempt artificial incubation who will not take the responsibility of seeing to his lamps and thermometers as often as once in three hours day and night if necessary. Not that no incubators may be left for six, eight, or even ten hours; but when a sudden fall in the outside temperature takes place, when the wind changes, and all that, there is danger of the heat getting less, and under other circumstances, still more danger of the heat getting too high.

It is curious that eggs, during most of the period of incubation, may now and then become for a short time, stone-cold without detriment, while a very little over-heating will prove fatal. I know a lot of eggs, perhaps 100 or 150 in number, which, when within two or three days of hatching, were sent on from New York to Providence there to be exhibited with the incubator in which they had been brought thus far toward hatching. They were laid in a basket packed about with cotton wool, and so transported without heat. On arrival they were quite cold, but soon warmed up and nearly all hatched. At this period eggs bear a great deal of moving about, and greater changes of temperature than at any other during the three weeks of incubation.

The most easily regulated source of heat, the most economical, and the one subject to least fluctuations, is a kerosene lamp. The use of gas, where this is possible, is not advisable, on account of the constant fluctuations of the flame arising from variations in the pressure. It matters not how perfectly the heat is regulated, it is much better to have few or no fluctuations to regulate. The use of fermenting manure as a source of heat is absurd and abominable, very difficult to regulate, expensive, and unpleasant.

A gardener in charge of greenhouses or hot-beds always has them on his mind, asleep or awake, and yet his mind is not burdened. At any notable change of temperature occurring he lifts the sashes, opens the ventilators or closes the same; he builds more fire, or covers the sashes with mats, thus keeping the heat in and the cold out, or the reverse, according to the necessity. In the same way any one using an incubator must keep it on his mind, and by turning his lamp up or down maintain a temperature as near 102° as possible. On the occurrence of sudden changes he must not trust the self-regulating appliances, but watch the thermometers, and keep the heat a degree below the normal temperature for fear of a sudden rise. Incubators should be started early, so that experience in managing them may be gained before the spring approaches. The instructions which accompany them are of course important.

The Beauties of the Law were illustrated by a recent case in England. Three persons were arrested for stealing 56 lbs. of grapes from a hot-house. The prosecutor found that it was not unlawful to steal growing fruit, but the rascals were short-sighted enough to carry off the scissors with which they cut the grapes, and they were tried on

the charge of stealing scissors, and one was sentenced to three months, and his two associates to one month's imprisonment each.

The Canada Thistle.

Probably no weed is held in greater dread, and justly too, by farmers, than the "Canada Thistle." In localities where it is, fortunately, not known, its reputation has gone before, and farmers, when a new weed makes its appearance in their grounds, at once ask if it is not the dreaded "Canada Thistle." The number of plants that have been suspected of being this Thistle, and have been sent with a view to ascertain the facts, is very large. The plant is known by the name "Canada Thistle" in this country only; it was probably introduced from Europe by the way of Canada, and was so called for this reason. In England it is known as "Creeping Thistle," and "Corn Thistle," and in France and Germany by the names in the language of those countries which translate into "Field Thistle." There are several native kinds of Thistle, and besides the "Canada," one other introduced species is common upon our farms. The general appearance of a Thistle head should be well known, it being often figured as the emblem of Scotland. Numerous tubular purplish flowers are collected in a close head, which is surrounded by a globular, or egg-shaped, usually prickly *involucre*, as the greenish cup-shaped portion at the base of the head is called. A plant suspected of being the "Canada Thistle" should have a flower head of this kind. To distinguish the "Canada" from all other thistles, the size is sufficient. The heads are rarely an inch in diameter, usually not over half an inch. The plant throws up slender stems, usually two feet high, though in rich grounds it may be taller. The plant sometimes bears only sterile, and sometimes only fertile flowers; the heads of the former are globular in shape, the others being egg-shaped. The flowers are of a dingy purplish color. The foliage is of a pale-green color, each leaf narrow, deeply lobed on the margin, and with numerous very sharp prickles. An engraving is given of a single lower or root-leaf, and a flowering stem in its young state; later, when the unopened heads come into flower, their stems will elongate, and raise these flowers to nearly the level of the upper one. The leaves upon the upper part of the stem are smaller and exceedingly spiny. The "Canada Thistle" has the reputation of being the most formidable weed of agriculture (though a native, the so-called "Horse Nettle," *Solanum Carolinense*, is far more to be dreaded), and we are often asked how to destroy it. When it once is well established, and its long creeping root stocks which branch in every direction, get possession of the soil, they are very difficult to eradicate. The plant is introduced by the seed. The first year it makes but little show, only a tuft of leaves, with no ascending stem. In this state it is busy in preparing for the future, by getting possession of the soil, its running root stocks are formed, and a store of food laid up in them for the growth of future plants. Fortunate is the farmer who recognizes the pest on its first appearance, as he can then easily uproot the plant, and save much future trouble. Where a few plants have made a foothold, they have sometimes been destroyed by cutting off their flowering stem and applying a small handful of salt to the freshly cut root. Unfortunately the plant is not usually noticed until it is well established and forces itself upon the attention of the farmer. Where there is a large patch no uprooting or salting will answer. The plant "means business," and unless the farmer accepts the challenge, he had better sell out, or the Thistle will eventually get the better of him. There is no one fact more thoroughly proved than that a plant can not live long without leaves. If the green foliage be cut off as often as it appears above the surface, the plant *must die*. If cutting with a sharp hoe, every few days, if need be, be persisted in, the plant, will in time be exhausted. If it be cut two or three times in the season, the plant will like it rather than otherwise, and probably spread all the faster for it. It is a case in which there can be no half measures; it must be "war to the knife and the knife to the hilt," else the farmer will come out of the fight second best. We know of cases in which persistent work has conquered this formidable weed: it will do so every time.

LEAF, ROOT, AND FLOWER-STALK OF THE "CANADA THISTLE."

Farming as an Occupation.—II.

BY HON. GEORGE GEDDES.

What is success in life? If we mean the accumulation of great wealth—then few men in any business will be successful. If we mean the acquisition of a competence, then most good farmers succeed. Just how they succeed I cannot show by giving particulars, beyond mentioning certain great principles which are necessary to success in nearly every kind of business; among these may be specified, industry and economy, directed by intelligence. Let us test this matter on a large scale. At the end of the Revolutionary war, say one hundred years ago—there was scarcely a white man living, in all that part of the State of New York lying west of Utica. Dense forests covered all the land, and before food could be produced, at least twelve day's labor of a sturdy axe-man was required to clear an acre fit for planting corn or wheat, among stumps that must remain in the way of the plow for many years. This land once cleared, except the stumps, must be fenced with immense labor. Houses and barns must be constructed. Mills, bridges, roads, then school houses, then churches, came in their order. No rich men went there, except as speculators, hindering the progress of the country by buying land in advance of the demand of settlers, and raising the price as the settlements advanced. The rich lands teemed with malaria, and this was especially true along the streams which gave sites for mills, which were to form nuclei of villages. Notwithstanding all these, and many other obstacles, the farmers on this part of our State, have accumulated a mass of wealth, which now appears in cities, villages, farms, and all the elegances of the most advanced civilization. But why cite the cities and villages as the work of the farmers? Because they all owe their existence to the fields around them—and their inhabitants are but the manufacturers and exchangers of the productions of the soil. Besides this accumulation of wealth that can be seen, the settlers of this land have supported themselves, educated their children, encouraged all branches of business, and made them prosperous. This shows that farming does pay, when viewed in its aggregate results. It not only pays, but it makes everything else pay. Looking at this work of a century, we ask, what will the descendents of these farmers do with the accumulations of following centuries. They pay no rent to landlords; the profits are all their own.

This is but the money view of the subject. The pure air and health that have resulted from drained swamps and cultivated lands; the room to enjoy life, and the ability to stay all the year at home, as compared with city life, which forces an absence of a month or two every summer in pursuit of health; these and many other considerations which make a country life desirable, are not to be lost sight of, when we are enquiring whether

farming pays. There are men, and many women, who cannot endure the imagined monotony—and retirement of country life. They must go faster, they must have more money, and spend more than farming will give them. Let such people have their way, and do not urge them to live away from the pavements. There will be farmers enough without them, to meet all demands for food and material for clothing all the non-producers. There is now, ever was, and ever will be, the sharpest competition in farming, of any business whatever, and the great question with farmers, always is, will paying prices be received for their products?

The wonderful improvement in the tools and machinery used on farms, and the vast extension of railroads to new fields, make the question of markets in which to sell the farm products much more pressing, than the one so often put in the past, how shall we keep farmer's sons on the farms, and prevent their going into the cities to swell the ranks of competition there? Let them go; the cities need their new blood, and their brothers whom they leave behind, will rejoice in their success in building up markets.

Young men, city raised, often enquire as to where they had better locate, with a view of spending their lives on farms. My first answer is, go to some good land. Do not accept poor land as a gift, unless it is near some town which will pay for perishable articles that will not bear long transportation, but as railroads are now managed, it is hard to say what will not bear, what were but lately called long distances. Farming near city markets demands peculiar gifts, among them ability to peddle "truck." Let us return to the consideration of what has been done in Central and Western New York. The pioneers of these two regions were mainly of the same stock; and the differences that can now be found between the people living in the northern towns of Oneida County and the lands thereabouts, and the people in Livingston County, are due to the soils and climates there found.

On fruitful soils in good climates, the best people not only remain, but leave their children. On lands in some of the northern parts of this State, the forests were the attractions to the pioneers, and the timber once removed, the land is too poor to enable any considerable population to find support. So it will become a great park, in which to raise deer and trout. Guides and health or pleasure seekers will be its principal population.

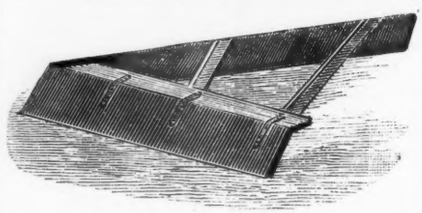
If you are to be a farmer, as the word is now understood, go to a healthful country having a fruitful soil. If you have capital, go where farming is most perfectly conducted. Purchase a highly improved farm, and let your capital put you at once into the possession of the fruits of the labor of those who made the country productive and healthful. If you have but little capital, go West, buy some land and grow up with the country, knowing if you make a living for the first ten years that reasonable wealth will come in due time. If you make a good location, buy all the land you can hold, and not fall into the "land poor" class.

I am often asked, as to the most desirable size of a farm. This must depend on the size of the man who is to own and conduct it. The present tendency is in the direction of large farms. Machinery costs much, and will do much, and its profitable use calls for much land. Small farms neither justify the cost of machinery that does work cheaply, nor the employment of much hired labor. So the sure result is, the occupant will have much hard work to do, with but little profit. The large farm gives employment to its conductor, in directing the work, and justifies a system of resident labor, performed by men having families living in houses on the farm, and boarding themselves. I once asked a very successful middle-aged farmer of many acres, as to the comparative profit of small and large farms, knowing that he began with a farm of about seventy acres, and at that time had about three hundred. His reply was that he had gone into debt for all his land, and had paid for it by its own productions, but that his progress had been very slow while he had but little land, and was faster as he increased his debt for more acres. This is a man of marked success. He was raised on a farm. A near-by Academy gave the facilities for a good education, and natural energy and ability enabled him to create capital out of his business. Very few men, in any business, do any better than such men do on farms. It is true that he has his cattle, and horses and sheep to take care of, and his men to direct, but this really makes less trouble than the management of most kinds of property.

So it comes to this—the man himself decides, as to the work he shall do in life, and while I do not deny, that "time and chance happeneth to them all," yet I confidently assert, that if to the industry, skill, and economy I have suggested as being necessary, there be added the aid of a wife in like manner endowed with these qualities, there is no manner of life so likely to insure success.

A One-sided Snow Plow.

Mr. E. E. Keller, Monroe Co., N. Y., has a snow plow that throws the snow all to one side, and on this account is very handy in many places. One side of the plow is made twice as long as the other, and by properly adjusting the draft, only the short side faces



A ONE-SIDED SNOW PLOW.

the snow. A sort of mould-board is fastened on this side with iron straps, as shown in the engraving.

A "Broken" Shaft for a Grindstone.

Mr. James Meyer, La Salle Co., Ill., having experienced the inconvenience of a long

Fig. 1.—THE JOINT SEPARATED.

handle to a grindstone has provided himself with one that folds up and is out of the way when not in use. Figure 1 shows the "windlass" or shaft, removed from the stone. A slot is cut in the end of the shaft, about four inches from the turning surface, and the portion bearing the crank is made to fit into it, being held in place by a bolt and a wooden pin. When not in use the pin is removed, and the crank falls down out of the way, as shown in figure 2.

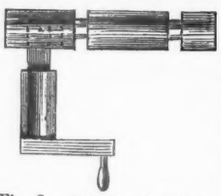
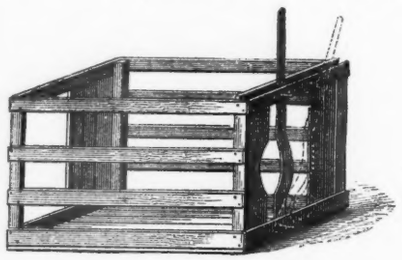


Fig. 2.—THE SHAFT TURNED DOWN.

A Pig "Trap" or Holder.

Mr. G. W. Fair, Edgar Co., Ill., sends a sketch and description of a device for holding pigs while being rung, which he has found very convenient. He writes: "The 'trap" may be placed at the end of a shute



A TRAP FOR HOLDING PIGS.

or passage-way, or by the side of a pen having a small door opening into the 'trap.' As the pig attempts to pass out at the opposite end of the 'trap,' a lever is brought up, and the animal is held fast by its neck."—The construction of the pig-holder, and the working of the lever, are made plain by the accompanying engraving.

Birds and Canker Worms.—II.

BY PROF. S. A. FORBES.

The species in whose stomachs no trace of canker worms was found, were the catbird, house wren, cliff swallow yellow-winged sparrow, chipping sparrow, field sparrow, crow blackbird, wood pewee, flicker or yellow hammer, and quail. It is worthy of remark that all but two of these species (catbird and pewee), were represented by only one bird each; and it is therefore probable that some of them would have been found eating the worms, if a greater number had been shot. The thrushes, blackbird, crow blackbird, and red-headed woodpecker, were the only ones found making any serious attack upon the predaceous beetles. The thrushes, as already mentioned, had eaten 12 per cent of these valuable insects; the bluebird, 60 per cent; the blackbird, 10 per cent; and the woodpecker, 38 per cent. Taking, now, the whole number of birds together, as one group, we find that canker worms had been eaten by 60 per cent of the *species*, and by about 64 per cent of the *birds*; and that they made 45 per cent of the food of all the birds taken in the orchard.

A more detailed statement of the entire food of these birds may not be without interest: Insects, 91 per cent; mollusks, 2 per cent; thousand-legs, 1 per cent; spiders, 2 per cent; wheat and seeds of grass and other weeds, 4 per cent. Caterpillars other than

canker worms made 15 per cent; leaf-chafers, 4 per cent; wire-worms and click-beetles, likewise 4 per cent; ants, 3 per cent; and snout-beetles, 1 per cent. Predaceous beetles (Carabidæ) amount to 5 per cent of the whole food. From these data it is impossible to avoid the conclusion that the birds were greatly hindering the progress of the canker-worm in this orchard.

A brief comparison with data previously published by me, will show that it was the abundance of the canker worm which attracted them to this orchard in such extraordinary numbers. In the third bulletin of the Illinois State Laboratory of Natural History will be found, among many others, tables of the food of the three thrushes mentioned in this paper, fifty which had been shot in May, in many localities, and in a great variety of situations. Only 13 per cent of the food of these fifty thrushes, thus taken at random, consisted of caterpillars; while these insects made 40 per cent of the food of the same species as represented by the birds shot in the infested orchard. The difference between 13 per cent and 40 per cent, measures the degree to which these birds had been diverted from their ordinary food by the excessive number of canker worms. Further, the blue-birds reported in the above-mentioned paper in the bulletin, had eaten but 12 per cent of caterpillars in May, while in the one shot in the Tazewell County orchard, canker worms composed 60 per cent of the food. Unpublished notes now in my hands relating to the food of the black-throated bunting, show that caterpillars made but 17¼ per cent of the food of thirty-one birds, shot here and there, in May and June; while they make 72 per cent of the food of the eleven specimens of this species reported in this paper. These facts can bear but one interpretation—that the birds were unconsciously but efficiently concentrating themselves upon the labor of reducing this injurious excess of an insect species to its usual limits. It is difficult to estimate the actual number of worms destroyed by the birds during the season, but it is evident that they must be reckoned by the hundred thousand.

The number of predaceous beetles eaten by a few of the species above mentioned, made it a matter of interest to learn what these beetles themselves were doing to the worms, as it was conceivable that the predaceous beetles taken, might, if left undisturbed, have destroyed more worms than did the birds which ate them. To get what light I could upon this matter, I critically studied the contents of the stomachs of twelve of the carnivorous beetles collected in the orchard. In two of these I found easily recognizable fragments of canker worms; viz., in one *Galerita janus*, and in one *Harpalus Pensylvanicus*. The other ten specimens belonged to four species—*Calosoma calidum*, *C. scrutator*, *Scarites subterraneus*, and *Cheœnius diffinis*. The Scarites contained no food; the other species were all feeding upon the same class of objects, represented by very minute, irregular fragments of red-brown insect crust. There were no appendages or other structures in these stomachs to show definitely the character of the insects from which these fragments had been derived; and I can only surmise from their appearance and from the abundance of canker worms in the food of the birds taken here, that these were the insects indicated. At any rate, it is certain that only two of these twelve beetles had eaten canker worms; and, as nearly as can be judged from Mr. Garman's report of the number of predaceous insects in the orchard, they were doing relatively little for the destruction of the worms. But one parasite of the worm was noticed. It is therefore probable that, setting aside the intelligent interference of man, birds constituted the only important check afforded by organic nature upon the excessive multiplication of the canker worm.

The American Museum of Natural History.—Forestry.

But few New Yorkers, and still fewer of visitors to the city, seem to be aware that there is near Central Park, in fact practically on it, one of the finest museums in the world, so far as it goes. It is situated on 8th Avenue, near 77th street; and readily reached by Elevated Railroad. But one wing of the proposed building is yet erected, and this is filled with excellent collections, arranged in a manner that reflects much credit upon the Superintendent, Prof. Bickmore. We are glad to announce that the value of the museum is to be greatly increased by an admirable collection of Economic Forestry. This collection will include every tree belonging to the United States; the specimens will be large, and exhibit the wood in the rough, and finished, in a way to show its various uses. The products of the trees, and the various articles manufactured from them, will be included in the collection. As it is important that the leaves, flowers, and fruit of the trees should be shown with the woods, and as dried specimens are not satisfactory for popular instruction, an original water-colored drawing of these portions by an artist skilled in this work will be added.

That this collection is being made under the direction of Prof. Chas. S. Sargent, of the Arnold Arboretum, Harvard University, is sufficient assurance of the accuracy and value of the work. Good progress has already been made, and collectors are still getting specimens in Arizona, California, and other distant localities. It is safe to assume that this collection will have a value beyond that of any other of its kind heretofore made. The whole expense of this grand enterprise, which has already amounted to several thousands of dollars, is borne by Morris K. Jessup, Esq., a New York banker, whose liberality has been manifested in various other directions for the public benefit.

A Home-made Apple Pulper.

Mr. Geo. L. Rector, Wood Co,, W. Va., makes his own cider, and grinds or pulps the apples with a machine shown in figure 1. It

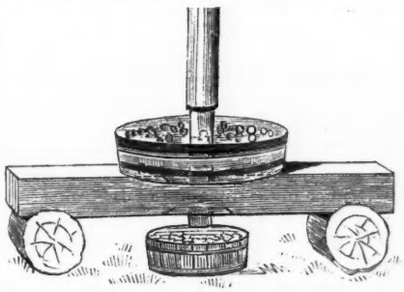


Fig. 1.—THE APPLE PULPER.

consists of a log 12 inches in diameter, and as long as desired, with a mortise cut in the middle as shown in side view in figure 2. The upright lever or "ram" fits in this mortise and is held in place by a stout pin. There should be ¾ of an inch space between the lever and the sides of the mortise, for the mashed apples to fall through into the tub placed below. A hopper, made of an old tub, is fitted upon the opposite of the log, and around the mortise into which the cider apples are poured. "With such a machine," Mr. R. writes, "a man can mash six bushels per hour, and work at a moderate gait."

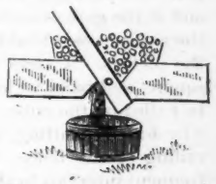
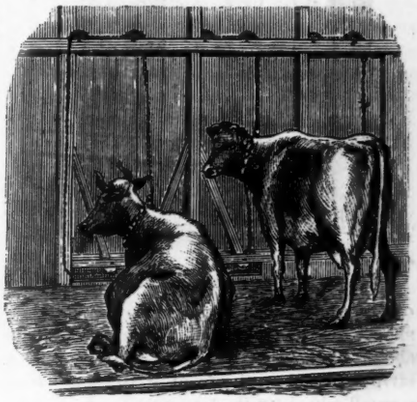


Fig. 2.—INTERIOR VIEW.

An Improved Tie for Cattle.

A friend in Bergen Co., N. J., in building a dairy barn for some 40 cows, has given much thought to the matter, and introduced every improvement that he thought would pay. When it came to the matter of fastening the animals in their stalls, he was much averse to the old-fashioned stanchion, and

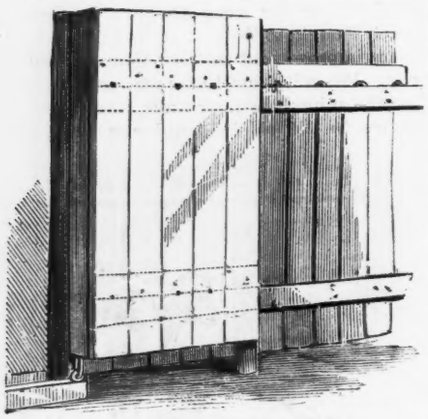


IMPROVED CATTLE-TIE.

while hesitating between this, and the upright rod with a sliding ring, to which there are also objections, he came across an account of the Improved Cattle-tie, recently invented by Mr. H. M. Robbins, Newington, Ct. Upon inspection of this he at once adopted it, and is now most enthusiastic in praise of its excellence as well as its cheapness. The affair is so simple that the wonder is that it had not been thought of long before. Each tie consists of an endless chain passing over four pullies, two upon the beam overhead, and two near the floor of the stall. The chain is so arranged that it cannot by any possibility slip from or be pulled off of the pulleys. A short chain passes around the neck of the animal and is attached to one of the upright portions of the endless chain. The arrangement allows the animal every desirable freedom of motion, whether standing, eating, or lying down, and while it is enabled to lick all parts of its body, it is not able to interfere with the neighboring animals. It is claimed to be, and appears perfectly safe, not only in the sense of security but in the avoidance of accidents. However they may be in reality, stanchions cannot be so arranged that they will not look uncomfortable, and to one who loves his animals it is worth something to see them in the apparent ease they enjoy here.

A Sliding Gate.

Mr. E. E. Keller, Monroe Co., N. Y., has a sliding gate in a tight picket fence, which is cheap, handy, and easily made. He writes: "In building the fence, the post to which a gate is to be hung, should be on the outside, and if the gate is more than four feet long, the second post should also be put outside of the pickets. A strip of hard-wood, $^7/_8$-inch square, and twice as long as the gate, should be nailed on the outer edge of the top of the 2 by 4-inch scantling, which makes the upper railing of the fence. Casters are placed at frequent intervals in the upper surface of this scantling, and should project about half an inch above the surface. The gate is made with its boards or pickets facing opposite to those of the fence, with the lower edges of the scantling twice as long as the gate, and a half inch higher than the upper surface of the fence. A $^7/_8$-inch strip is nailed on the under side of the scantling, to slide easily between the fence boards and the similar strip



A SLIDING CLOSE BOARD GATE.

on the upper side of the fence scantling, as shown in the engraving. These two strips should be bound with hoop iron. A 2 by 4-strip is placed on the front of the gate, with a small wheel on its lower end, which rolls upon a sill placed in the ground. The casters which I have used are from an old bedstead."

Barn Door Fastening.

One of the best barns in the country has its large double doors fastened by a bar of iron, about six feet long, which is bolted to one of the doors at its middle point. The ends of the bar are notched, one upon the upper and the other on the under side to fit over sockets or "hooks" that are bolted to

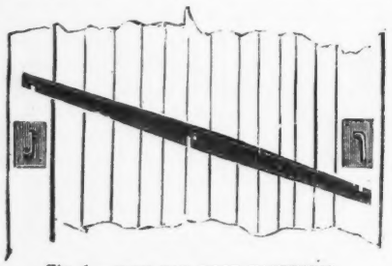


Fig. 1.—IRON BAR DOOR FASTENING.

the doors. One hook bends upward, and the other downward, and the bar moves in the arc of a circle when the door is being unfastened or bolted. The construction of this door fastening is shown in figure 1. A wooden bar may replace the iron one, and may be of a size and length sufficient to make the fastening secure. A wooden bar is shown in figure 2. Such a method of fastening could be used for a single door, provided it needs to be opened and closed only

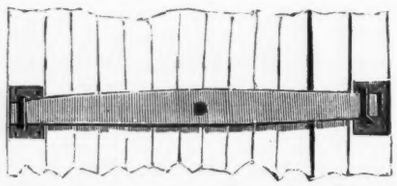
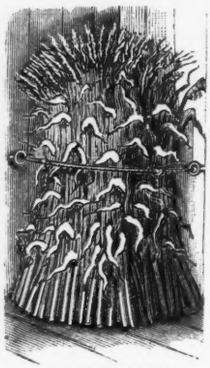


Fig. 2.—WOODEN BAR DOOR FASTENING.

from the inside. By putting a pin in the bar near the end that passes by the door post, so that it will reach through a slot in the door, such a "latch" might be used for any door.

A Corn Fodder Holder.

"X. Y.," Columbus, Ohio, sends his method of securing uncut corn fodder, which is shown in the accompanying engraving, made from his sketch. Fasten two staples with rings in the sides of the shed, each equally distant from the corner, two feet or a little less, and tie the end of a rope to one of the rings, while the other end of the rope is provided with an iron snap. The corn stalks are placed in a standing position in the corner, and the rope is brought in front of them and snapped to the other ring. The construction of this easily made "fodder rack" is easily understood from the engraving.



A FODDER HOLDER.

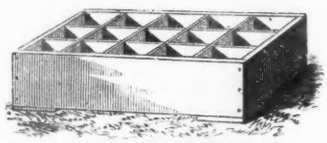
Cut-Worms in the Garden.

When one has set out in the well prepared soil of the garden the cabbage plants he has carefully raised, and a few mornings after finds that a large share of his plants is missing, the stems being cut square off near the ground, he says, "The Cut-Worm." He is in no mood to make entomological distinctions. The cabbages are killed by cut-worms, and to him there is but one kind—*the* Cut-Worm. In practical entomology the gardener classes insects by their work, and it makes no difference to him if there are three or four caterpillars, the larve of as many different moths, if he finds that their work is all alike they are all one to him in applying the remedy. If a cut-worm has cut the cabbage plants, it is possible to find its hiding place, dig it out of its hole, and put an end to its work. There is a satisfaction in knowing that this particular worm will cut no more, and that in killing it, future progeny is likely to be diminished. It would appear that cut-worms have been very numerous the past season, as we have had many complaints of their destruction of cabbage plants. Among all the complaints there came one suggestion of a remedy, or rather preventive.

It is old, but it is a long time since we referred to it, and it may be new to some of the young gardeners of the present day. It comes from J. F. T. B. Brentano, Marion Co., Oregon, who writes: "We Oregonians circumvent this pest, by wrapping a piece of paper around the stem of each plant as it is set out. The paper should extend a little distance below the ground, and as far above as it can go without interfering with the leaves." In speaking of the kind of paper, he suggests that rich people may use greenbacks, but poor ones must rely upon old copy books or even newspapers, but "the *American Agriculturist* will not answer at all for this use, as it should be kept," a conclusion with which we agree. That this method is effective we know, and we do not doubt that on a large scale it would pay, where the time required to apply the paper would cost less than to replace the plants destroyed. Several years ago some one wrote that he applied a maple leaf, in place of the paper, in planting a large field. The leaf of the Red Maple being chosen merely because it was sufficiently large at the time he put out the plants.

A Plant Box with Divisions.

Among the many devices to allow plants to be handled without disturbing the roots, we have seen none so simple as the one here illustrated in the figure below. A shallow box of any desired size is provided with partitions to divide it into square compartments. The bottom of the box, instead of being nailed on in the usual manner, should be small enough to slip *inside* of the frame formed by the sides and ends, and held in place by a few screws or nails that are not driven quite home. As many strips of straw-board are provided as will make the desired number of divisions. One set of these, should have a cut made from the center to the upper edge, and the set that crosses them should be cut from the center to the lower edge; this will allow the two sets to lock together. The compartments thus made being in place, they are to be filled with soil, and a few seeds sown in each, all the plants but one being removed when large enough to be well established. Or seeds may be sown in other boxes, and the plants, when large enough, may be transplanted to this, placing one in each division. When it is time to set out the plants, the box may be taken to the garden; the screws or nails that hold the bottom being taken out, the frame can be lifted off, leaving the squares of soil undisturbed. Each



A BOX WITH DIVISIONS.

one of these, if carefully taken up by means of a flat trowel or a piece of shingle, may be put into the hole prepared for it, without breaking a root fiber. Such boxes will answer where seedlings are raised in the window as well as in a hot-bed.

White Grub and Strawberry Borer.—J. Webster, Marion Co., Ill., writes that he and others have lost from one-fourth to one-half of their strawberry plants. The White Grub and the Borer that attacks the crown of the plant having been especially abundant during the late drouth. We have in recent numbers given the only method with the grub, *i. e.*, to destroy the beetles.

The Broad-Leaved Burning Bush.

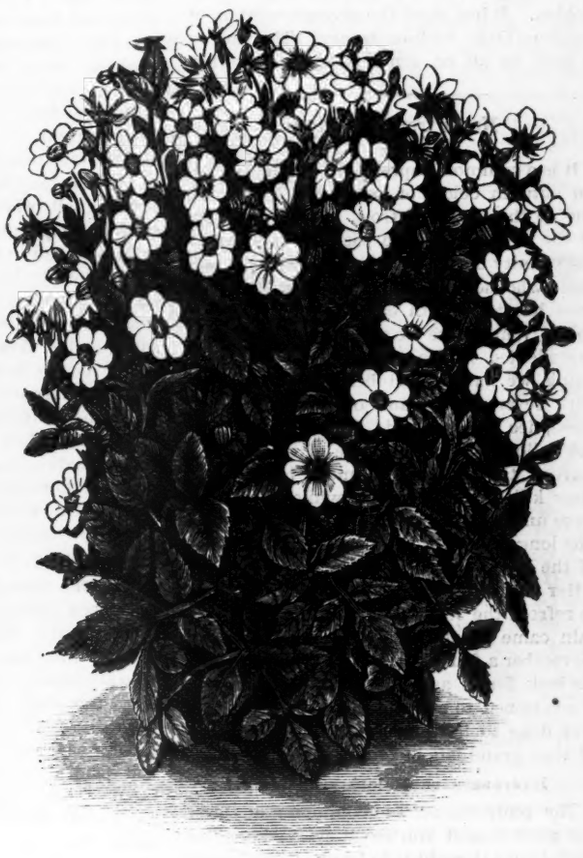
There are some shrubs of really superior character that do not become popular, while related species, vastly inferior to them, are seen almost everywhere. The European Burning Bush, or Spindle-Tree, and the American, are often met with, while the Broad-leaved is still among the rarest of shrubs. Whether it is because the nurserymen do not offer it prominently, or because buyers of shrubs do not know it, we can not say, but we will endeavor to remove the latter reason by calling attention to its excellence as an ornamental shrub. It is a native of Southern Europe, and is said to reach the hight of 15 feet under favorable circumstances. As we have seen it, six or eight feet is its usual hight, and it assumes a dense bushy form, clothed with broad leaves of a dark rich green. The flowers, as in other species, are not conspicuous. The fruit is in clusters which are on long and slender foot stalks, and always droop. The exterior of the capsules is crimson, and the seeds which are shown when these open are bright orange red. This Burning Bush (*Euonymus latifolius*) retains its leaves later in autumn than the other species, and is a most beautiful object.

THE BROAD-LEAVED BURNING BUSH (*Euonymus latifolius*).

Thinning Peaches.—The account by a Michigan correspondent of his "first Peach Orchard," given elsewhere, calls to mind a request that we made several years ago, and to which no response was received. It was to this effect: it is admitted that a thorough thinning of the young fruit will prevent the evils to the tree consequent upon overbearing; it is also known that if the fruit is severely thinned, that which is left to mature will be larger and finer, but how much? In order to ascertain whether the operation will pay on the large scale or not, we asked for statistics, hoping that some of our peach-growing friends had compared the returns from thinned, and unthinned trees, and might be able to show in dollars and cents whether or not the fruit would sell for enough more to pay for the labor of thinning. We now repeat our request for facts on this point.

The Single Dahlias.

The illustrations of the single Dahlias given last month convey some idea of their appearance as cut flowers, but fail to show the ornamental appearance of the plant itself. In view of the fact that these plants are likely to become exceedingly popular in this country, where they will meet with a more favorable climate than that of England, we borrow from a recent number of "The Garden" an engraving showing the plant as it appears in the border. The engraving is from a photograph of a plant in the nurseries of T. S. Ware, Tottenham, Eng., where in the autumn of 1880 we first saw a collection of these Dahlias, and were impressed with their beauty and value. The variety here illustrated is the "White Queen," regarded as the best of the whites, and shows the compact form of the plant and its abundant bloom. Unlike the old tall double varieties, the plant can be sufficiently supported by a single stake which is readily concealed by the foliage. In the double kinds the heads are so heavy that they often require support, and when wet with rain will break down. In the single forms the long flower stalk has sufficient strength to hold up the flower, and display it to the best advantage while on the plant, and allow of its effective arrangement when cut. In this variety, the rays are large in proportion to the disk, and of a pure white, with great substance. The number of varieties of single Dahlias will no doubt be greatly increased when they come into general cultivation with us, as our long summers will allow of the ripening of its seeds in abundance. If the seeds are sown early, the plants potted singly, and turned out when frost are over, a large share will bloom the first year.



THE SINGLE DAHLIA—"WHITE QUEEN."

Grimes' Golden.—This apple was introduced by S. B. Marshall, of Ohio, who sent us abundant specimens; we figured and described it in Jan. 1867, giving Mr. M.'s description of the tree, with Dr. Warder's and our own of the fruit. This induced Mr. B. Scholl, of Wash. Co., Md., to make a trial of the variety. He writes: "The tree is a good grower on my soil, and the fruit is excellent for eating and for drying; it can not be excelled as a cooking apple by any variety in its season, which is from September to January. Besides it is a good bearer of *annual* crops of fruit."—We are glad to hear such a good report of a variety which we helped to introduce. Mr. Marshall claimed that his trees had not failed to produce a good crop annually for 18 years, and while we did not doubt his statement, we feared that the tree might not bear with equal regularity elsewhere, but the note of Mr. Scholl shows that

it does. This regular bearing is an important matter in an apple for family use; the usual way is, an excess one year and almost no fruit the next. In our original description, the quality was ranked as *best*, and Ellwanger & Barry, who are not given to extravagance in praise of fruit, say: "Of the highest quality, equal to the best Newtown Pippin." The original tree was standing in 1867, in Brooks Co., West Va., and had been known since 1804. In a selection, however small, of fruit for family use, we should include Grimes' Golden. It has stood the severest winters of northern Ohio without injury. The variety is now in all of our first-class nurseries.

Notes from the Pines.

It is a common impression that the beautiful autumn colors of our forest leaves are due to the action of frost. An observation of the trees during the past few months, in the vicinity of New York, must have shown those who hold to this idea, how little the frost has to do with causing the change of color. While were we suffering a drouth unprecedented in the experience of any now living, we had in October three mornings with severe frosts, and on at least one of these, ice was formed. These frosts were not followed by any change of color in the leaves; those upon the more tender trees were killed, and soon fell, while those that were uninjured remained as green as before. The long drouth had suspended the functions of the leaves and they had not yet ripened. After these frosts came slight rains, sufficient to refresh the leaves, and some weeks later rain came in abundance, and there was in November a fair display of the bright colors we look for in autumn..... Some time ago I méntioned to a friend that a great service was done to horticulture by the introducer of that grand late-blooming shrub

Hydrangea paniculata grandiflora.

The reply was: "Too common; anybody can grow it, and you see it everywhere."—I had always thought it to be one of the great merits of the plant, that anybody could grow it. I was somewhat surprised at the remark, as I had supposed that one of the objects of horticultural societies and rural journals was to create a taste which would lead to our seeing beautiful plants "everywhere."....I have occasionally seen this

Hydrangea Grown as a Standard,

a form to be commended, at least for a variety. A single stem is trained upright to a stake, and a head formed at the hight of about four feet, allowing three or four buds at the top to push, and rubbing off all that start below these; the upper buds will form branches and bear a large panicle at the end of each. After the flowering is over, these branches should be cut back to about three buds each; the next spring these will give a very full head and a great mass of bloom. Close pruning of this shrub, in whatever form it may be grown, greatly improves both the size of the clusters, and of the individual flowers, and I think that the change of the flowers from white to pink is finer than on unpruned shrubs. One advantage in the standard form is, the great clusters, when heavy with rain can not reach the ground and be soiled....This training of plants, that usually form bushes—as standards, is an

Interesting Occupation for the Amateur,

and useful too, especially to one whose window or greenhouse space is limited. The Heliotrope, for example, is so much better in this shape that one who tries it will not afterwards grow this plant in any other form. It requires no great amount of skill; a little attention as needed, and time will do the rest. Begin with a straight young plant from a cutting, and whenever a side shoot starts, remove it, allowing growth from the upper point only. Place a stake to support the stem, and take care that it grows perfectly straight. The whole object being to form a straight stem, all flower-buds should be pinched out as they appear. When the stem is three or four feet high, cut it back to the desired hight, usually two or three feet high, and allow as many of the uppermost branches to grow as may be desired for the head, suppressing all others. The future treatment consists in pruning in such a manner as to keep the head in a regular shape. Ordinarily the Heliotrope is a most unsatisfactory plant on account of its straggling habit of growth; treated in this manner it is easily kept in form, and it flowers freely; besides it saves room, as the head stands well above other plants.....Another plant suited to this training is the Lantana, a still more rambling subject; this, when grown with a clean stem, which bears a compact head, studded with its brilliant flowers, is indeed a beautiful object. There are many other plants which the amateur may train in this manner, and find much interest in shaping them to his will.....

The Tuberous-Rooted Begonias

have been rather slow in making their way to popularity. This may be due to the high price at first asked for the bulbs. If those who attempted to raise them from seed fared no better than myself, they may well have been disgusted. When seeds were first offered, I sent to a celebrated grower in France, and paid a round price for two packets of them. They came up freely, and the plants grew well; after caring for some dozens of plants for a year or more, they began to bloom, and every plant, without exception, produced small dingy-white flowers. But they all had beautiful *tubers!* Not a plant of the lot was worth keeping. Since then some of my friends have had fine success; the seedlings, some of them with enormous flowers, in various shades of scarlet, crimson, etc. Used in masses, they produce a fine effect, being equal in brilliancy to the best Geraniums, and superior to them from the fact that rains do not injure the flowers; after a heavy rain storm the flowers recover at once, while those of Geraniums are quite ruined, and the bed appears ragged until new clusters open. Besides, these Begonias can be stored so conveniently; they are allowed to dry off, and the tubers are kept until it is desired to start them in spring. They make very fine pot plants also.....I have heretofore suggested that in selecting shrubs for planting, we should not look to the beauty of the flowers solely, but include some that have showy fruit. A few clusters of bright berries lighten up the shrubbery wonderfully in autumn. Among shrubs with showy berries nothing can be finer than

The Common Barberry

in full fruit; the graceful curve of its stems and the pendent coral-like berries make it a charming object. A little species from Japan, Thunberg's Barberry (*Berberis Thunbergii*), only about two feet high, makes a neat compact mass of green, against which its berries, which are not in clusters, but solitary, large and bright scarlet, show with fine effect.....

The Scarlet Clematis of Texas,

which was figured in March 1879, has proved to be a valuable plant; it bloomed all summer, and was not checked by the severe frosts of early autumn. Its flowers are not very large, but they are so bright that every one who sees the plant is pleased with it.....I have wondered that we have in this country

So few Amateurs with Hobbies.

Those who devote themselves mainly or solely to one class of plants, and by giving their attention to these reach a perfection not otherwise possible. In Europe there are noted growers of the Auricula, the Rose, the Chrysanthemum, and many others, whose achievements have given them a wide reputation. What a splendid hobby the Clematis would be in all its species and varieties, and what a chance for still new floral prizes in the way of new beauties it offers!

"My First Peach Orchard."

A correspondent, "J. V.," Oakland Co., Mich., who has now over 3,000 peach trees, gives an account of his first orchard. We give this essentially as written, for two reasons; first: as an encouragement to others, as Oakland Co. is far from the peach-growing localities of the State, and it shows that even under adverse circumstances his land gave him fair returns. Secondly, for the purpose of suggesting some points in which the management might have been improved. Mr. V. writes: "Four years ago last spring, I planted 300 peach trees on poor sandy land, setting them 16 feet apart each way; all the trees lived. For the first two years I planted corn in the orchard, which gave a fair crop for such land. The third year I planted beans, which were a failure, but that year I had 20 bushels of peaches, which I sold for $2.50 per bushel. This year, the third, I discovered that the borer was injuring the trees, and I dug out of the 300 trees about 700 borers. Last year, the fourth, I did not plant any crop in the orchard, but cultivated the soil and kept it perfectly clean, and also hunted the curculio. I picked and sold 500 bushels of choice fruit, which returned me $600 clear, after paying freight and commissions. I made use of about 1,000 props, besides several balls of hemp twine to keep the trees from breaking down. The injury by the borers the third year, the heavy crop of the fourth, followed by the severe winter which we had in Michigan, together caused the death of about half of the 300 trees."—This experience is interesting, and it may be instructive to analyze it, and see what our correspondent made by the operation. Three hundred trees, at 16 feet apart, occupy less than two acres (which would hold 342 trees), but we will call the land two acres. We are not told what the returns from the corn were, but it is fair to assume that the two crops, and the $50 for the first crop of fruit, the third year, paid for the trees, their planting and all the cultivation, so that at the beginning of the fourth year, the orchard had paid all its expenses. Supposing that all the trees, instead of one-half, had been killed, the fire-

wood would pay for the clearing the land, and give a profit besides. The $600 received for the fourth year's crop, gives the handsome showing of a yearly return of $75 per acre for each of the four years, which is probably much more than the land originally cost, and much more than what is regarded as an average return in the celebrated peach districts of Delaware and Maryland. This report is a particularly unfavorable one, for it is rare that a peach orchard does not give more than one full crop—yet what could J. V. have done with two acres that would have paid him better? In what respect could our correspondent have done better with his first orchard? He says that the soil was "poor and sandy,"—"sandy," so far as it means light, is well for a peach orchard—"poor" is not. While peach trees should never be put upon low wet lands, they should have what is considered good corn land. The growing of corn between the rows until the orchard comes into bearing, is regarded as good practice in the great "Peninsula" peach district. The second drawback was in neglecting the borer until the third year. Every tree, before planting, should have been carefully examined to see that none had already made an entrance, and every fall and spring thereafter, each tree should have been examined. The excessive crop of the fourth year, and the many props and the stays of twine indicate that the young trees had been allowed to grow at will, without any shortening of the branches to form a compact head. While peach-growers differ as to whether it pays to do any "cutting in," as it is called, after the trees fairly come into bearing, all agree that it is desirable to do this upon the young trees, and cut back, in fall or early spring, one-half, more or less, of the growth of the previous season. There is another point for peach-growers to consider; much time was expended in cutting and adjusting the 1,000 props, and "several balls of hemp twine" cost something, and time was consumed in applying it. Suppose that all these items of expense, in time and money, had been directed to thinning the fruit when small, would it not have been more profitable? We feel quite sure that it would have been, so far as the future of the trees was concerned. How it would have been in money returns for the fruit we cannot say. Of course the winter-killing, which was, in many localities, very disastrous that winter, could not have been avoided, though it might not have been so extensive had not the trees been exhausted by overbearing. We consider the experience of J. V. encouraging to those who, outside of what are regarded as peach districts, would like to experiment in peach culture.

Green Corn in England.—The directions for cooking green corn which appear from time to time in the English journals are very funny. The last we have met with says: "Boil the cob in milk for one hour, and then broil it, basting with butter and salt."—We wonder what is done with the rest of the corn while the "cob" is being treated in this manner, and what is done with the "cob" after it is broiled and basted!

The Variegated Panic-Grass.

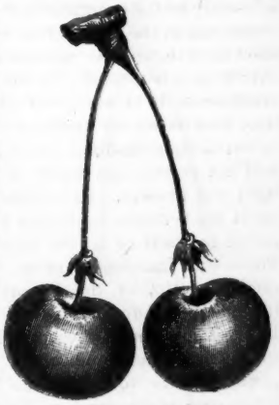
Plants that will flourish in the usually dry air of our houses are not numerous, and every one that will do this is worthy of note. The little grass, introduced from one of the South Sea Islands some years ago, as *Panicum variegatum*, is a capital basket or bracket plant. The grass has much the habit of the troublesome "Finger"—or "Crab-grass," its prostrate stem taking root at every joint. This creeps where there is soil, and when it reaches the edge of the basket or pot, hangs over in a graceful manner. The size and shape of the leaves are shown in the engraving, which, being from an upright stem, does not show the creeping habit. The leaves are light-green, with broad stripes of creamy white, and if the plant has sufficient sun, the foliage is tinged with pink. While the plant grows more rapidly in the damp atmosphere of the greenhouse, if well supplied with water it is very satisfactory as a window plant.

THE VARIEGATED PANIC-GRASS (*Panicum variegatum*).

The Cultivation of Peppermint.

A letter before us from Lancaster Co., Pa., is a specimen of many. The writer claims that he knows nothing whatever of the culture of Mint, or if it will succeed in his locality, and wishes us to tell him how to grow it. We believe and constantly advocate a mixed husbandry, believing it better, save in a few exceptional cases, than the plantation system with but one or two large crops. But in a variety of crops, we would not advise what, for the want of a better name, we call "special crops," that is crops that are outside of the usual farm products, and which can not be turned to account on the farm, but must be disposed of. Such crops, of which Peppermint is an example, are subjects of speculation, and if any one makes much out of them it is usually not the farmer, but a dealer. Another reason why we do not have more to say about such crops as Peppermint is, they can only be sold in the manufactured state. With Mint it is not the plant that is sold, but its oil, and to produce this of the best quality requires a kind of skill which the farmer's training has not taught him. It is safe to say that very few men, whether farmers or not, however intelligent, could on the first trial succeed in producing a first class Oil of Peppermint, and this is the only kind that can be sold. It is true that much money has at times been made by growers of Mint, but statistics show that, taken a series of years, the land in one of the celebrated Peppermint districts did not produce an average of much over $30 an acre. We hear of the profits when they reach $300 an acre, but the average crops do not get into the papers. It is because we feel that we should not benefit the farmers by it, that we do not encourage these unusual crops. Here and there one may make it fairly remunerative, but we are sure that the failures in the case of Peppermint would greatly outnumber the successes.

For One Cherry—"The Kentish."—"If you have room for but one pear tree, what variety would you plant?"—The answer to this in ninety-nine cases in a hundred would be—"Bartlett." A similar question about cherries would be answered by those familiar with varieties by—"Kentish." One can form some idea of the value of a fruit by the synonyms, or different names that have been given it. The "Kentish" has over a dozen other names. It has been largely planted in the Western States as "Early Richmond," and some experienced fruit growers still consider that as distinct from the Kentish. In some localities it is known as "Early May." The tree has a rounded, spreading head, is very productive, and bears regularly. The fruit begins to color towards the end of May, when it is small and very sour, but may be used for pies; it hangs on the tree through the month of June or later, increasing in size to medium, and becoming less acid, and very juicy and rich. This variety is characterized by the clinging of the remains of the flower to the stem, as seen in the engraving, and the tenacity with which the stem holds to the stone. When quite ripe, the stone may be pulled out by means of the stem, leaving the pulp ready for drying or canning, for which uses it is unequalled. It is an old European variety, and may be found in all nurseries as Kentish or as Early Richmond. It is an exceedingly profitable market cherry.



THE KENTISH CHERRY.

THE HOUSEHOLD.

☞ *For other Household Items see "Basket" pages.*

Household Plants—Why not a Palm?

The term "Household" in preference to "House" plants is used on purpose. We have seen, and no doubt the reader can recall, plants which seemed as much a part of the owner's household effects as any article of furniture. Such a plant is kept in the family year after year; it is among the earliest recollections of the children, and when the household is broken up, it goes as an heirloom in the division of the estate to a son or daughter, who cherishes it for the associations connected with it. Formerly a Laurestinus or Pittosporum was the favorite plant, or it may be an Orange or a Lemon tree, of which the mother had planted the seed when a girl. Sometimes an Oleander answered the purpose, which could be put in the cellar on the approach of winter, to be brought out in spring for its annual summer bloom. We do not now see plants of this permanent character so often as formerly. It may be that the substitution of coal stoves for open fires has made it more difficult to keep them, or it may be that the greater ease with which more showy plants of brief duration can be procured, has led to the neglect of those of a more permanent character. The plants we have mentioned are well suited for the purpose, and, as they occasionally bloom, are more interesting to many than those which do not flower. To our notion elegance of form in the plant itself is vastly to be preferred to a brief yearly flowering. We know of nothing that we should prefer as a household plant, one that is to be a companion year after year, to one of the half-hardy palms. A graceful palm, each leaf of which is a study of the beautiful in form, is pleasing every day in the year. One advantage is its slow growth, and its appropriateness wherever it may be placed. It may stand at the window or in a corner of the room, or it may find its winter quarters in the hallway, or on a stair landing. Any place where it will not freeze, and where it has a share of light will answer. In summer it may ornament the veranda, or it may grace the lawn, either by itself or as the center of a group. Those with fan-shaped leaves, like the Southern Palmetto, or the European Fan-Palm (*Chamærops humilis*) are among the more hardy kinds, but they spread and take up more room than some others. Palms of the genus *Phœnix*, to which the Date Palm belongs, are much used in Europe for home decoration; they are of exceedingly graceful habit, and do not spread so widely as some others. The one given in the engraving, to show the general appearance of these palms, is *Phœnix sylvestris*, often called the "Wild Date." The true Date (*P. dactylifera*), makes a good house plant; we have known them to be raised from the stone of the imported fruit, and after some years become quite elegant specimens. If one wishes a palm, and can afford to wait, it can not be had cheaper than to plant some date stones, which we have known to grow even in the open ground. Not many florists keep a stock of palms, though some, foreseeing the growing taste for such plants, are prepared to meet it. Small specimens of desirable species may be had at 50c. to $1; really fine plants may be had for $5 and upwards. One, in purchasing a palm, will do well to rely upon the florist to select the kind best suited to home culture, as it is not the rarest and most costly that is best suited to the treatment it would receive.

A GOOD HOUSEHOLD PLANT—THE WILD DATE.

Our Graham Flour.

BY A MINNESOTA HOUSEKEEPER.

There is a low growl here and there over the quality of the Graham flour most common in the market, but few seem to care very much about it. I dislike to be almost the only one to scold in public about the outrageous swindle practised upon the buyers of Graham flour, but it does seem to me that protest ought to be made. Things have come to such a pass that the only genuine Graham flour I can get has to be brought from Ohio, and I have to pay six cents a pound for it, since the recent rise in all wheat breadstuffs. It has grown more and more difficult to get unbolted flour from Minnesota wheat. It is offered at four cents a pound (three cents until lately), but I do not want it at any price. My neighbor sends to New York and buys flour manufactured by the "Health Food Co." from our Minnesota spring wheat. It is called "cold blast whole wheat flour," and purports to be the whole wheat minus the thin clean woody bran. It seems to me exactly what we might get right here at home very much cheaper, if we *could* get genuine unbolted flour made by the "new process," and sift out the bran ourselves, or if the millers would give us this and keep their bran. The new process of milling gives us much more nutritious white flour than we used to get by the old process. "Grinding high," instead of setting the stones close together, peels off the bran without any appreciable gluten attached to it, so that the bran cannot now be very nutritious food for cattle, it seems to me, and I do not see how it adds value to Graham flour, except when bran is needed as a mechanical irritant to torpid bowels. As wheat was formerly ground, and is still in many eastern mills, much of the grain remained attached to the bran.

The middlings purifiers take the canaille, or shorts, and remove therefrom both starch and gluten, which, added to the fine white flour of the interior of the wheat kernel, make a greater bulk and a more nutritious quality of fine flour than could be produced by the old process, or without the middlings purifiers. Much used to be said by health reformers against superfine white flour as a steady article of diet, but the white flour of the present is much more nutritious than that in use several years ago, owing to the addition of gluten caused by the use of the middlings purifiers.

But "the worst thing about this new process is that it spoils the Graham." This is what a proprietor of one of our best mills told his wife—and she told me. I wondered why, but I think I understand. It is very evident that the Graham flour we get now from our home mills has been robbed of the starch portion, and I more than suspect that it is mostly a mixture of bran and the refuse of the middling (or shorts) after these have been "purified," and the better portion added to the fine flour. Sometimes pure white flour may be added, sometimes corn meal, and sometimes (I should think) the sweepings of the mill!

No, I don't want it. But I do want good Graham flour, however good the white flour may be. I believe we should have a better article of diet for our daily bread (if it is really to be a "*staff* of life") in flour made by grinding high, and so peeling off a clean bran, and only the woody bran sifted out.

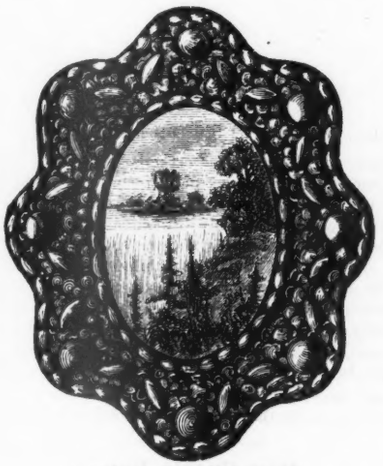
Good Graham is a very convenient thing to have in the house. I have to make a great deal of bread to feed my family, and this business is made much more easy by making a part of the loaves from Graham (all but the sponge set over night—this from fine flour) as there is no kneading about it, the light sponge being only stirred thick (and thoroughly) with Graham and a little sugar. Then there is the mush, so convenient to make in a hurry and so good for the children. And gems! Since we have been getting the Ohio Graham we have gone back to plain water gems, and they seem so delicious that we make them from choice, even when we have good buttermilk in the house. Nothing in the world beats Graham flour and water made in a soft batter, dropped in hot-buttered gem irons, and baked in a hot oven. For a long time these had been for me a "lost art," but I see now that the Graham (so-called) was in fault. When we first came to Minnesota we could get excellent Graham (our hard spring wheat unbolted) from country old style mills, and I dare say there are places where it could yet be obtained, but I know of none.

Consider the Children.—While I am writing this two little boys with thick shoes on, are galloping on canes back and forth through this room and the kitchen, playing horse. They are pretty noisy, but I think I can stand it for a little while. It is a rainy day, and they need exercise. I know a little

girl who is so helpful and thoughtful in her way that it would be an easy matter for an inconsiderate parent, to defraud her of some of her childish rights. The other day her mother was much surprised to hear her exclaim earnestly: "O dear! I *do* want a pretty doll as big as R.—'s. I should like to make its clothes so much! Why, mamma, I am growing older all of the time, and by and by I *can't* play with dolls." And she burst into tears. The mother saw the whole situation at once and replied: "Dear child! You shall have a doll. If you were to live a hundred years you never would be a little girl again. You shall have a doll and time to play with it too." It cut her to the heart to see how the patient little stocking darner and dish-washer rejoiced in the prospect of her new and pretty dolly. F. E. R.

A Pop-Corn Picture Frame.

A neat little frame, suitable for a card-ortrait or a small picture, makes a pleasing and useful article for a present. The one we have in mind was called a Pop-corn Frame, because that grain was largely used in making it, but a variety of other grains and seeds may be employed in the same manner. The frame in question was first cut out of thin board, but in the absence of that, stiff paste-board will answer. A row of cherry stones was fastened on both the outer and inner edge of the frame with strong glue. Then a Hazel-nut was put at each scollop; some plum stones were placed here and there, and the remaining space filled with pop-corn of the red variety, all fastened with glue. The fruit stones should be well cleaned, and the frame will look all the better if these have a coat of varnish before the corn is put on, that being sufficiently bright without varnish. This manner of covering a frame is given as a suggestion, but it may be varied, according to the materials one has at hand. Beans of different colors, and other seeds,



A POP-CORN PICTURE FRAME.

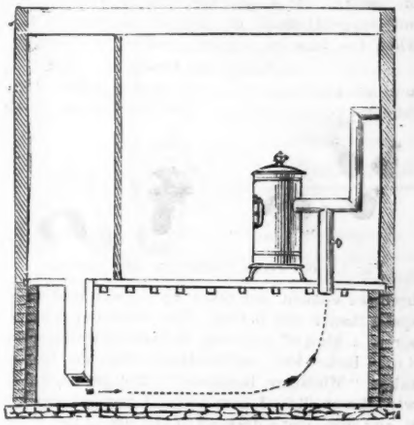
such as those of the Castor Oil plant; Beech-nuts, Chinquapins, very small Acorns, and other things will answer for the larger objects, while the pearly Rice Pop-corn, as well as the little bright yellow variety, will answer if the red kind is not at hand. One with a little ingenuity will find no difficulty in producing a pleasing effect. Glue for such uses should be very strong; it is easily made thus: Place in a tin cup some pieces of good cabinet-maker's glue, and pour on enough cold water to well cover them. Set in a cool place (away from the fire), over night, or long enough for the pieces to swell up and become limber. Then pour off all the water that will drain away, and set the cup in another dish in which is some water. Set the whole on the stove and allow it to heat gradually. The pieces of glue will dissolve in the water they have taken up; the solution, or made glue will be very strong, and must be kept hot while using by placing the cup in a larger vessel containing hot water. If more water should be needed, it may be added hot and a very little at a time.

Frost Bites and Chilblains.

Probably no other forms of accident or injury come upon us so unexpectedly as those due to excessive cold. As a general thing we are not aware that a part is being frozen until the mischief is already done. This is due to the fact that one of the effects of severe cold is to destroy the sensitiveness of the parts exposed. Surgeons make use of this fact in small operations and cool the parts by artificial cold. The ears, the nose, sometimes the cheeks, and the hands and feet are the parts most liable to be frozen. One of the first effects of freezing is to stop the circulation of the blood, and any part in which the circulation is checked by other means is all the more likely to be frozen. The old-fashioned skates, held on by numerous tight straps across the feet, are dangerous on this account, as to keep them in place the straps are drawn so tightly as to impede the circulation in the feet, and frost-bitten feet are often the consequence. Though the operation of freezing is painless, a sudden thawing is attended with inflammation and great pain. The thawing should be very slow in order that the circulation in the parts may be restored gradually. For this reason it is advised to rub the frozen parts with snow, or in the absence of that, with water made as cold as possible with ice. It is said that in Russia, when one observes that another's nose or face is being frozen, it is an act of common politeness to catch up a handful of snow and apply it to the face of the unfortunate, even if he is a perfect stranger. In cases of severe freezing, besides gradual thawing by the use of snow or ice, a physician should be called, as it may be that proper precautions are needed to prevent mortification of the parts. It is not necessary for the feet to be actually frozen to produce chilblains. The term frost-bitten is usually applied to such cases. Children often suffer greatly from getting their feet very cold, and then going to the fire to warm them. The circulation is disturbed and the parts remain exceedingly sensitive to future changes of cold and heat. Chilblains vary from a slight inflammation, to severe cases in which the skin breaks and even ulcers are formed. Of course such cases require professional treatment. To allay the intense itching and pain of ordinary chilblains, a great number of applications have been used. An ounce of Sulphate of Zinc (White Vitriol), in a pint of water, or an ounce of Sal Ammoniac dissolved in half a pint each of Vinegar and Alcohol are among the washes often used. It is stated on good authority, though we have not had occasion to try it, that the application of ordinary kerosene oil is very efficacious in allaying the itching and pain.

Ventilating a Cellar.

A correspondent, "J. P. F. K.," in Grand Forks Co., Dak. Terr., writes: "I have a small frame house, underneath which is a cellar nearly full of vegetables of various kinds. As some of these are needed daily through the winter, the storing them in a root house, which, owing to the intense cold here, must be kept closed during the winter, is quite out of the question." He asks: "How can I ventilate the cellar thoroughly, and at the same time exclude the frost." As no plan is given of the house or cellar, we must assume that the cellar extends under the whole house. Moreover, we assume that, being in a new country, stoves are used for both cooking and heating. To get rid of the foul air in the cellar a communication must be made between the cellar and either a chimney in which there is a constant upward current of warm air, or it may be made with the pipe of the stove. A piece of stove-pipe should pass



METHOD OF VENTILATING A CELLAR.

through the floor, and terminate just below it in the cellar. The end of the pipe in the room above the cellar may turn into the chimney, or if that is not practicable or desirable, it may connect with the stove-pipe. This upright pipe, which passes from the cellar, is to be provided with a damper. The cellar being thus connected directly with a flue, or indirectly with it by means of the stove-pipe, in either of which is a strong upward current, may be deprived of its foul air in a very short time. It will not be necessary or desirable that the ventilation be kept up continuously, hence the damper is put in the ascending pipe. This should be opened a short time daily, or as often as the condition of the air in the cellar shows it to be necessary. The diagram will suggest the arrangement where the connection is made with the stove. But if foul air is taken from the cellar, it must be replaced by other air from without. In a climate where the cold is continuously severe, it will not answer to bring the outer air directly into the cellar, as its contents would be frozen and spoiled. It may be well to provide for the admission of the outer air during mild spells, if such occur in the locality; this may be done by making a small opening in one of the cellar windows, that may be closed by a sliding shutter. If the air without is too cold, then the supply must be taken from the house itself. This should be done from a point as far distant from the exit pipe as practicable. The hall or entry-way may be the most convenient place, but anywhere will do if the air is not too warm or too cold.

BOYS & GIRLS' COLUMNS

The Doctor's Talks.

The questions that come to me cover a wide range of subjects. What can be more unlike than the last two?—Here is "B. F. W.," who wishes me to tell him why certain kinds of corn pop, and a young friend in New Jersey wants to know all about frost and snow. Probably one of the first crops raised by boys on a farm is pop-corn, and boys soon learn that pop-corn is different from common corn. It is usually a hard, flinty kind, with the kernels much smaller than the kinds of field corn.

What Makes it Pop?

Chemists who have examined Indian corn, find that it contains all the way from 6 to 11 parts in a hundred (by weight) of fat. By proper means this fat can be separated from the grain, and it is then a thick pale oil. When oils are heated sufficiently in closed vessels, so that the air can not get to them, they are turned into gas, which occupies many times the bulk that the oil did. When pop-corn is gradually heated and made so hot that the oil inside of the kernels turns to gas, this gas can not escape through the hull of the kernels, but when the interior pressure gets strong enough,

It Bursts the Grain,

and the explosion is so violent that it shatters it in the most curious manner. The starch in the grain

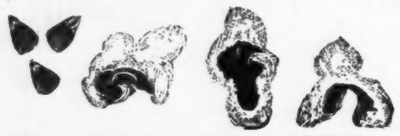


Fig. 1.—POP-CORN UNPOPPED AND POPPED.

becomes cooked and takes up a great deal more space than it did before. The other day I came across a kind of pop-corn, the ears of which were 3 or 4 inches long, and no larger than my finger, called "Miniature Brazilian." The grains, fig. 1, were the smallest I have seen. I popped some of it, and give you a drawing of the size of the grain before and after. I think, however, that some of the larger kinds increase much more in proportion.

In Popping Corn,

you need to heat it at first gradually, until the grains are well warmed through, and then suddenly increase the heat by bringing the popper nearer the coals, of course keeping up a lively shaking....It often happens that in answering a question I must talk about something else first, in order to prepare the way. This is the case with Frost and Snow, as they depend upon being formed from

The Moisture in the Air,

without which we could have neither. When the books tell us that the atmosphere consists of oxygen and nitrogen, they do not state the whole truth, as there is always a variable amount of water in the air; this is invisible, but nevertheless present. The amount of moisture that the air can take up varies with the temperature. When the weather is so cold that water will freeze (32°), then the air can hold but the 160th part of its own weight of the vapor of water. That is, 160 pounds of air can hold but one pound of water. On the contrary, upon a warm summer's day, when the thermometer marks 86° in the shade, it can contain four times as much moisture, or the 40th of its own weight, and one pound of water can be taken up by forty pounds of air. When the air has all the vapor of water it can hold at any temperature, it is said to be *saturated*. The amount, or as the books have it, "the capacity of air for moisture," depends upon the temperature. This is an important point to remember. As just stated, by making the air 54 degrees warmer, that is, raising it from 32° to 86°, it will take up four times as much water. Air that is damp at one temperature, will be very dry at another, although it really holds just the same amount of water.

2.—A "WEATHER MAN."

"How do we Know the Air is Moist?"

some of you will ask. If you fill a pitcher with ice-water, taking care to have the outside of the pitcher perfectly dry, you know that the outside will soon become moist, and after a while drops of water will trickle down, and if the pitcher stands on a paper or in a dish, a large space on the paper will be wet, or a small quantity of water will be caught in the dish. Those who do not examine closely say that the pitcher "sweats," but I think you can understand that this water all comes from the air around the pitcher, the cold surface *condenses* the moisture. That the air contains more moisture at one time than another can be told in part by the effects upon our feelings; when the air contains but little moisture, the skin seems dry, and the hair dry and harsh. It can be made visible by various instruments, called

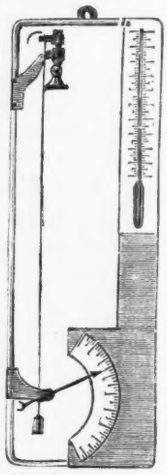


Fig. 3.—A HAIR HYGROSCOPE.

Hygrometers or Hygroscopes,

the latter name being the most correct, as these affairs are not really *meters*, that is, they do not actually measure anything, but they only show that the moisture in the air varies from time to time. Hygrometer is made up of the Greek words for *moisture* and *measure*. Hygroscope, from the words for *moisture* and *to view*, or *see*. I said that dry air would affect your hair, as that is very sensitive to moisture, and it is used in making the most delicate Hygroscopes. Figure 3 shows one of these, in which a long hair is stretched in such a manner that it can move a pointer along a scale. In a damp day the hair will be longer than in a dry one, and the movement of the pointer shows the difference. Hemp, flax, cotton, and other fibres are affected by moisture in a similar manner. You have no doubt noticed that a clothes line which was quite slack when dry, becomes very taut when damp, and even breaks when wet by the rain. You can make a rough

Home-made Hygroscope

with a piece of common twine. In order to show the changes distinctly, the string will need to be several feet long. You can fasten one end near the top of the room, and arrange the pointer low down; figure 4 will show how the pointer is made. You have no doubt seen those toys, where there is a little house with two doors and small figures of a man and woman; on a damp day the woman moves in and the man comes out, and when it is dry they change the order of their going. These are often called "barometers," but they are only hygroscopes, in which the movement is caused by the action of the moisture of the air upon a string of some kind. These are sometimes made in the form of a figure with a hood (fig. 2), which is pulled over the head on damp days and falls back in dry ones. As the air is often very damp for some time before a rain storm, these figures show that to be the case, and this is all that they can do in foretelling the weather. To come back to our question about

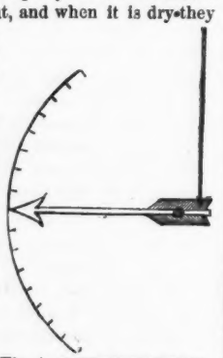


Fig. 4. CORD HYGROSCOPE.

Frost and Snow.

We have already seen that the air contains the vapor of water, or moisture, and that cooling the air will cause it to let go, or deposit a part of it as water. When the moisture of the air is deposited quietly and it collects on cool surfaces, we call it *dew*. If a current of warm moist air meets one of very cold air, the moist air is cooled, and can no longer hold its vapor, which condenses and form drops which fall as rain. If the object, the grass, the fence, or the bare ground becomes so cool that the moisture freezes as it falls, we have frost. When you get up on a very cold morning, you find the windows of your bed-room covered with frost, and so are the windows of other rooms if there is not heat enough to warm the glass faster than it is cooled by the air on the outside. This frost on the windows comes from the moisture in the air of the room. As dew, when the temperature is very low, appears as frost, so the moisture that would otherwise come down as rain, freezes and

Falls in the Form of Snow.

I have all along assumed that you knew that ice was water made solid by cooling. "Everybody knows that," you will say. I admit it, but everybody does not know that when water becomes solid its particles arrange themselves in a regular form, and make crystals of definite shape, with always just such angles. I can not just now show you how that we know the solid ice is made up of crystals. If you watch for a fine dry snow, when the flakes are scarcely to be seen in the air (a few such snows usually occur every winter) and catch the little flake on a black cloth, you will find them of the most beautiful and regular forms. There are a great many things that pass from the liquid to the solid state—common salt, alum, blue vitriol, and many others, which may be dissolved in water, and be made to take on the solid form again and appear as regularly shaped crystals. It is well known that the more slowly these crystals are formed, the more regular and perfect they will be. If they be made to become solid quickly, they are a shapeless mass. Rock-candy, you know, is in

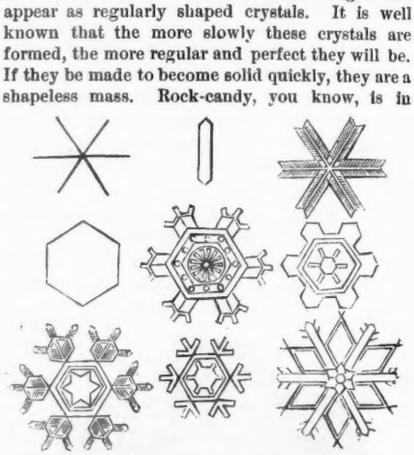


Fig. 5.—VARIOUS FORMS OF SNOW CRYSTALS.

handsome, regular, clear crystals; a piece of loaf or lump sugar shows no distinct crystals—yet both are the self same sugar, and the one can be changed into the other. The only difference between rock-candy and lump sugar is, the one had time to form its crystals very slowly; the lump sugar became solid suddenly. We have reason to suppose that the beautiful little crystals of dry snow are formed slowly, while the great white flakes, which you like to see, because they promise sleds and coasting, are made by the sudden cooling of the moisture, and many imperfect crystals stick together and form large flakes as they come down through the air.

Our Puzzle Box.

COMPOUND METAMOREMS.

(Last month we gave you simple metamorems; we make them a little more perplexing now, by letting the figure 8 stand for the word "ate," or "ait"; 1, for the letters "o-n-e"; 10, for "ten," etc.—*Example.* 5001=Done. 71608=State. 1900-10160=Intent.

1.	10009.	4.	1000150.	7.	190010500.
2.	20001.	5.	3000557.	8.	1001900250.
3.	429008.	6.	40015500.	9.	2000900500150.

SQUARE WORD.

1. An animal that we sometimes eat.
2. A flowering shrub.
3. An animal that we do not eat.
4. A vegetable.

EFFIE.

CROSS WORD.

My first is in finished but not in done,
My next is in scamper but not in run,
My third is in plump but not in fat,
My fourth is in mouse but not in rat,
My fifth is in river but not in lake,
My sixth is in tremble but not in quake,
My seventh is in grain but not in wheat,
My eighth is in lane but not in street,
My ninth is in beard but not in hair,
My tenth is in round but not in square,
My eleventh is in cattle but not in herd,
My twelfth is in sentence but not in word,
If good, as can be, we want to live,
My whole we may take but must not give.

BIBLICAL NUMERICAL ENIGMA.

I am composed of 42 letters:

My 1, 11, 15, 28, 7, 37, 3, 36, 23, was a Syrian idol.
My 8, 30, 22, 16, 5, 19, 31, 38, 13, was a Roman province.
My 20, 3, 35, 27, 41, 12, 32, 9, 25, was a surname of two disciples.
My 29, 1, 20, 16, 33, 2, 26, 4, 31, was an ancient article of armour.
My 39, 10, 6, 27, 21, 17, 4, 14, 40, was a town of Galilee.
My 42, 24, 11, 18, 15, 34, 6, 9, 25, was a ruler of a Jewish Synagogue.
My whole is part of a verse of the Bible. ISOLA.

PATCHWORK.

(Find in each of the following sentences, the letters necessary to spell the implied word.

EXAMPLES.—1. You can discover it a distance. *Answer.* Yonder. "Far" would not do, as there is no f, in the sentence. 2. You are a gosling. *Answer.* Young.)

1. Boil it if you like, or eat it raw.
2. You would not like to wear it.
3. Be very careful how you make it (not *cake*).
4. A brown paint made of soot.
5. Too dark for us to read.
6. Catch all the horses with it.
7. I found the poor animals here (not "field").
8. You can carry them in this.

PI.

Istude luflidel ear swayla slaperuse ot het my rome. Elfs-liarneec si equit tinsdict orfm fels uotressia.

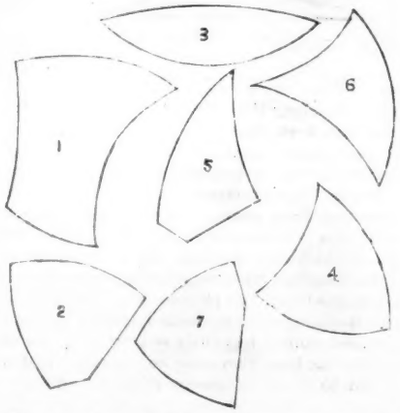
FOUNDATION WORD.

Recalcitrate.

(EXPLANATION. All the letters of the word "recalcitrate" are used in each sentence. EXAMPLE.—the *** sat ***** upon the ****. *Solution*—cat, erect, rail).

1. The guest drank some *** and ate some ****; and when he left he gave the waiter a *****.
2. The sky was so *****, that we could ***** ** for quite a long distance.
3. It excites my *** to see how the ****** are crowded into the ***.
4. They could find no ***** of the *******.

DIAGRAM PUZZLE.



Place a piece of thin writing-paper over the above diagram, and trace upon it with a lead pencil, the figures seen through the paper. Then cut them out of your paper, carefully, and trace each piece of paper upon cardboard. Cut out the seven pieces of cardboard, and put them together so as to form a correct circle of two and a half inches diameter. AUNT SUE.

TRANSITIONS.

(Change only one letter at a time. EXAMPLE. Change wine to milk in three moves. Wine—mine, mile, milk.)

1. Change boat to land in five moves.
2. Change dawn to noon in four moves.
3. Change boot to shoe in four moves.
4. Change rain to snow in nine moves.
5. Change lawn to silk in ten moves.
6. Change pink to blue in fourteen moves.

HAND IN GLOVE.

(The "hand" is formed by beheading and curtailing the "glove."—EXAMPLE. To consume, in a shrub. *Answer.* Eat, heath).

1. An animal in: to lessen.
2. An animal in a flower-bud.
3. An animal in portions.
4. A bird in humble.
5. Keenness in a book.
6. An animal in a receptacle.
7. An animal in a disagreeable expression.

HOW REYNARD LED BRUIN INTO A FISHING TRAP.

ANAGRAMS.

1. Name in a cent.
2. Bone us out.
3. Ah! these?
4. A Nile item.
5. A pert corn.
6. After curd.
7. Snip more mint.
8. I did set his gun.
9. To permit no nap.
10. Nice sport to it.

Answers to Puzzles in the November Number.

CROSS WORD.—Napoleon.

ANAGRAMS.—1. Dissatisfied. 2. Domestic. 3. Successor. 4. Sentient. 5. Abnegation. 6. Appreciated. 7. Influential. 8. Noiseless. 9. Coöperate. 10. Lethargic.

NUMERICAL ENIGMA.—Children obey your parents in the Lord, for this is right.

DIAGONAL.—Daniel, DOrcas HaNnah, HorAce, StelLa, GeralD=*Donald*.

HIDDEN VERBS.—1. Eat. 2. Sing. 3. Run. 4. Drag. 5. Tow. 6. Bleat.

RIDDLE.—Be, bee, beef, fees.

TRANSPOSITIONS.—1. Churl, lurch. 2. Charm, march. 3. Snipe, pines. 4. Bears, sabre. 5. Heaps, shape. 6. Parts, strap, traps.

DOUBLE ACROSTIC.—*Vashti—Smyrna*. 1. Vesuvius. 2. Abraham. 3. Sorcery. 4. Hagar. 5. Teman. 6. India.

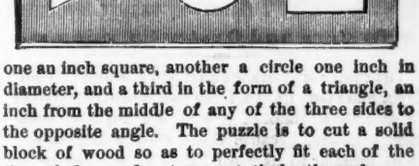
ENIGMATICAL BOUQUET.—1. Harebell. 2 Cowslip. 3. Foxglove. 4. Lady's Slipper. 5. Marigold. 6. Larkspur. 7. Phlox. 8. Morning-glory.

The Fox and the Bear.

The Fox has a way of doing things that has made him the type of cunning or slyness. He plays strange tricks with the hunter, who with gun and dog seeks to secure his skin, and its soft fur. He also leads some of the other wild animals into tight places, and by sharp forethought gets the better of his foes that are many times his size. The picture here given shows how a fox entrapped a great bear. The story runs something like this: One day in winter a fox and bear met in a great forest and the fox told the bear that he had a new method of catching fish, which was so good that he had never failed to obtain all the fish he wanted whenever he had tried it. The bear was glad to hear of this, and at once accepted the invitation of the fox to try his hand—or tail rather—at fishing. They both journeyed along in great glee until the lake was reached, when the fox, finding a hole in the ice, told the bear he must put his tail through the ice and into the water, that the fish might bite it and be drawn out. Perhaps the young reader will think that a bear's tail is not a very long thing, but a good story must not be spoiled by the shortness of a tail. The bear having adjusted himself to his work, the fox told him the catching was simply a matter of time. After several hours the fox returned to his most patient—we will not say stupid, pupil, and found him engaged in a fruitless attempt to remove himself from the ice in which his tail had been frozen. A few words passed between Reynard and Bruin; the fox explained how a very cold day was not the best for fishing, etc., but in the heat of his address was interrupted by the approach of a hunter, who, coming up, found the bear not only alone but also an easy victim. Bear meat was plenty in one hunter's home that night, and Reynard told the exploits of the day to his family, and the little foxes laughed themselves to sleep over the sad fate of Poor Bruin who would a fishing go.

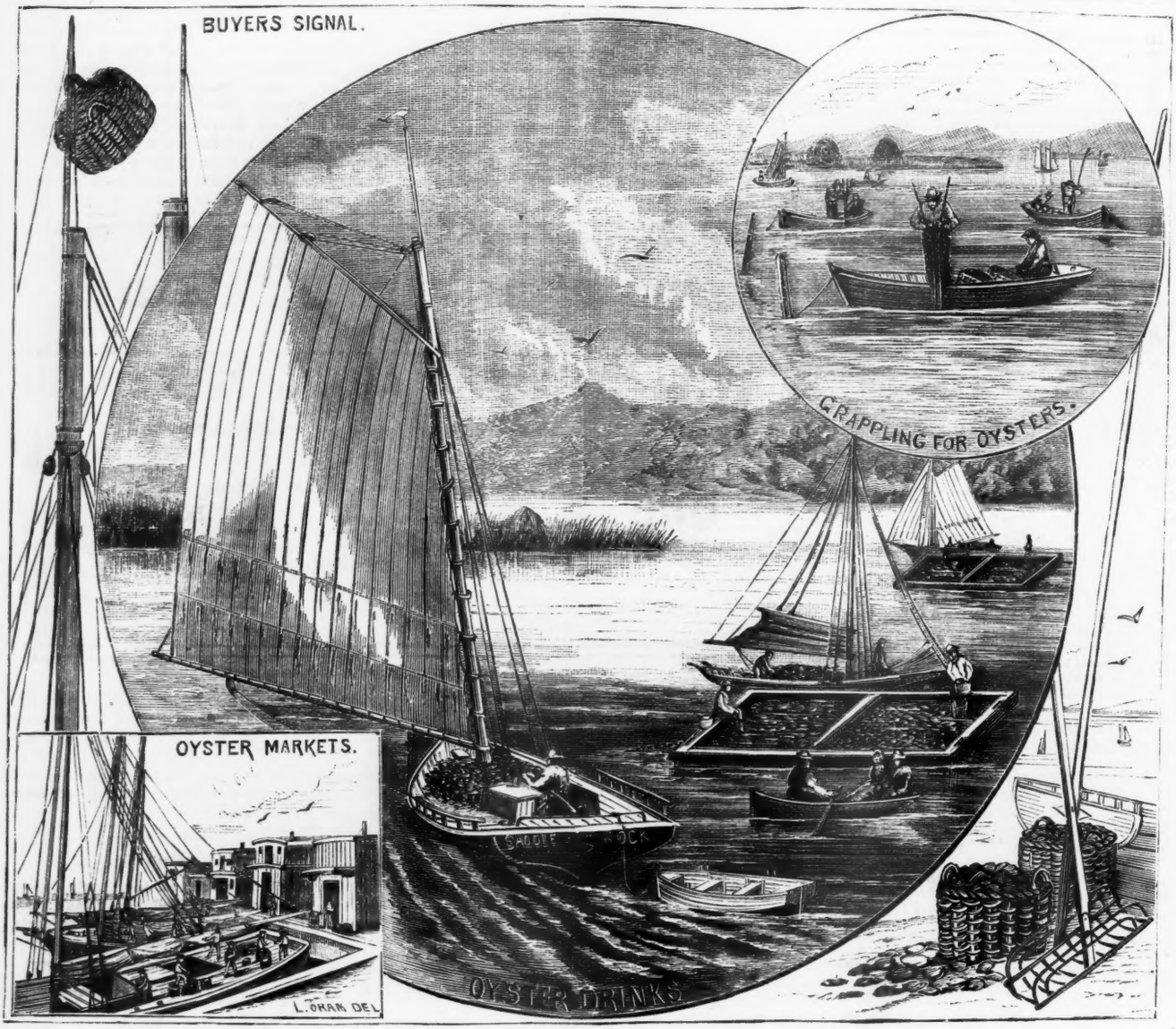
A Plug Puzzle.

"M. A. M.," sends a cut for the puzzle department which he describes as follows: "Take a thin sheet of brass (sheet iron, wood, leather or paste board would do as well), and cut three holes in it—



one an inch square, another a circle one inch in diameter, and a third in the form of a triangle, an inch from the middle of any of the three sides to the opposite angle. The puzzle is to cut a solid block of wood so as to perfectly fit each of the three holes, and yet pass entirely through.

Illustrated Rebus No. 489.—Thoughtful words in pictorial clothing to all who in any way aspire to the life "enjoyed" by royal personages.



OYSTER FARMING AS PRACTISED ALONG THE AT-LANTIC COAST.

Oysters and Oyster Farming.

The oyster is a strange sort of an animal. Children, and many grown folks too, when one speaks of an animal, think of a cow or a horse, or some large creature, because these are the largest and most familiar to us. All forms of life belong to either plants or animals. A rosebush is a plant, and a goat is an animal, but it is not always so easy to tell to which branch or group of living things an object belongs. There are many plants that move from place to place by their own action, and there are animals that are as much attached to the rock or earth upon which they grow as a tree is. If the boys and girls should just here ask me to tell the difference between an animal and a plant, I should be obliged to say, I do not know. I can tell a horse from a maple tree, but these are extreme cases. Most persons can tell the color, red from blue, but the red approaches blue through many shades, and in the same way the blue shades into the red, until one may be sometimes at a loss to know where the red ends and the blue begins.

All this talk is to show you that all animals are not alike in having those things that are common with the most perfect and higher forms of animal life. The Oyster is an animal without legs, and therefore cannot walk; it has poor eyes and cannot therefore enjoy the scenery of the world in which it lives. The oyster was never known to stumble and fall down stairs, and experience the pain of a broken bone, and for very good reasons. The early life or childhood of the oyster is now well known. It grows or hatches from an egg that is so small as to be seen with difficulty. No boy would think of carrying oyster eggs to market in a basket, or bring them home from an egg hunt in his hat. After hatching, the young oyster swims about for a time, after which it may be said to "settle down to business," and attaches itself to some hard object where it remains for the rest of its existence. The oyster feeds upon the sea water. I take it for granted that all the young readers knew that the oyster, perhaps most familiar to many as the leading element of a very excellent soup, is a water animal, a "shell fish," as it is sometimes called. The young oyster, at three months—the age when human babies have their picture taken now-a-days—is not larger than a pea; they are not of sufficient size for market until in their fourth or fifth year.

But what is this "oyster farming" mentioned in the title? How can an animal that grows in the ocean be a farm crop? Is it possible that oysters are planted and cared for in a way that a field of corn is grown? Until recent years an oyster bed—by which I mean a portion of the bottom of the ocean where oysters grow—was considered free property. Much as bad boys look upon a melon patch—the first come the first served. At present oyster beds are owned, and the crop is actually planted and grown. There are a great many such cultivated oyster beds along the Atlantic Coast. When the "seed" has been planted, as young oysters, in the bed, they grow rapidly, that is for such slow going animals as oysters, and become plump and fat, and in striking contrast to the poor and slender oysters that have grown in unfavorable places. The oysters are harvested by means of oyster tongs. The oyster men go out in small boats over the beds and bring the oysters to the surface and into the boats. As the oysters come from salt water, they are naturally charged or filled with sea water, and more or less bitter and unclean. To fit them for the table they must be "floated," that is exposed to fresh or partly fresh water. The "floats," or "drinks," are large boat-like structures, 30 to 40 feet long, 2 feet deep, with openings and holes, in which the oysters are placed and are washed by the fresh water coming usually from the mouth of an inflowing river. After a few days the oysters become freshened and are ready for the market. Where they afterwards go I will leave for the young reader to imagine. To say that the oyster figures largely in stews, fries, and other foods would not be taken as an untruth.

The engraving shows something of the oyster farming near New York. Two "drinks," are shown in the central picture. The method of catching, or grappling, the tools in oyster farming, and a market scene occupy the corners. UNCLE HAL.

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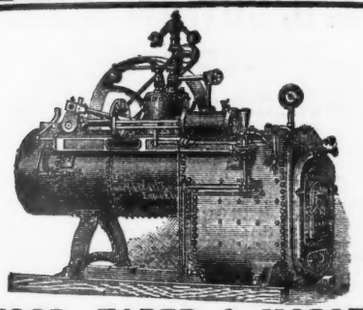

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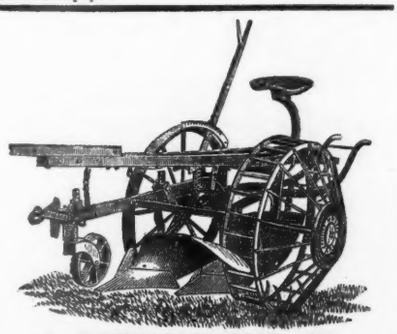

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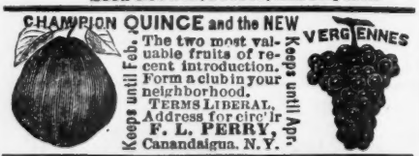
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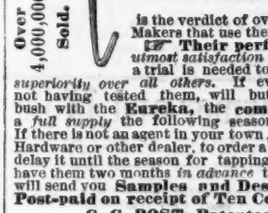

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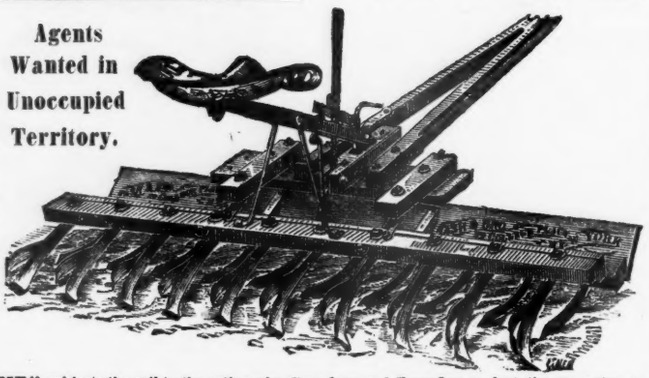

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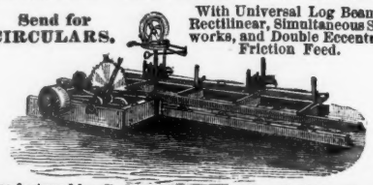

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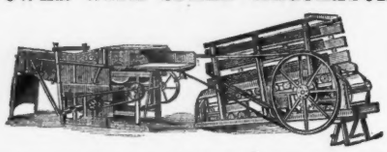

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Every intelligent person knows that **it pays** every man, young or old, to provide himself, or if he has a family, to provide them with **good books.** The Orange Judd Co. publish a large number of the best books on Agriculture, Horticulture, Field Sports, Horses, Cattle, Sheep, etc., etc. A condensed list of these will be sent to any one forwarding by postal card his address to the Publishers, and asking for Book List No. 2.
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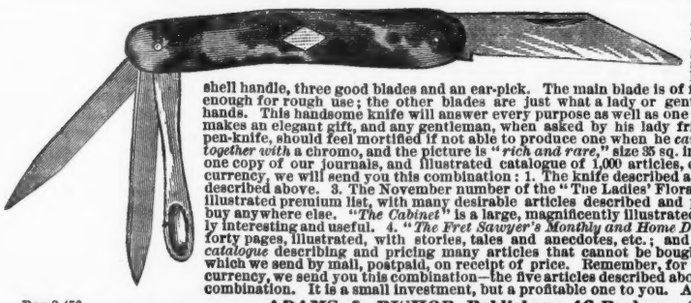
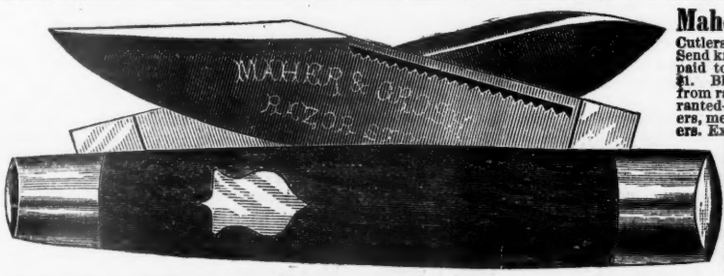


We Give Away, in order to introduce our journals and our goods, a very handsome and useful pen-knife, with tortoise shell handle, three good blades and an ear-pick. The main blade is of fine steel and is strong enough for rough use; the other blades are just what a lady or gentleman needs for the hands. This handsome knife will answer every purpose as well as one that sells for $1.50. It makes an elegant gift, and any gentleman, when asked by his lady friend for the loan of a pen-knife, should feel mortified if not able to produce one when he *can obtain it for nothing together with* a chromo, and the picture is "*rich and rare*," size 35 sq. in. If you will send for one copy of our journals, and illustrated catalogue of 1,000 articles, only 25c., in stamps or currency, we will send you this combination: 1. The knife described above. 2. The Chromo described above. 3. The November number of the "The Ladies' Floral Cabinet," with large illustrated premium list, with many desirable articles described and priced, that you can't buy anywhere else. "*The Cabinet*" is a large, magnificently illustrated home paper, intensely interesting and useful. 4. "*The Fret Sawyer's Monthly and Home Decorator*," a journal of forty pages, illustrated, with stories, tales and anecdotes, etc.; and 5. *A large illustrated catalogue* describing and pricing many articles that cannot be bought out of this city, and which we send by mail, postpaid, on receipt of price. Remember, for only 25c., in stamps or currency, we send you this combination—the five articles described above. Send for this 25c. combination. It is a small investment, but a profitable one to you. Address,

Box 2,456. **ADAMS & BISHOP, Publishers, 46 Beekman St., New York.**



Maher & Grosh, Cutlers, **Toledo, Ohio,** Send knife like cut postpaid to any address for $1. Blades hand-forged from razor steel and warranted—a knife for farmers, mechanics, and hunters. Extra strong, 2-blade farmers' knife, 75c Medium, 2-blade, 50c. 1-blade, 25c. Extra strong 1-blade, 50c. **Butcher knife,** 6-inch, hand-forged blade, by mail, 50c. **40-page** list sent **free.** *Discount to Dealers.*

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containing a great variety of Items, including many good Hints and Suggestions which we throw into smaller type and condensed form, for want of space elsewhere.

In justice to the majority of our subscribers, who have been readers for many years, articles and illustrations are seldom repeated, as those who desire information on a particular subject can cheaply obtain one or more of the back numbers containing what is wanted.

Back numbers of the "American Agriculturist," containing desired articles, or those referred to in the "Basket" or elsewhere, can usually be sent post-paid for 15 cts. each, or $1.50 per volume.

Clubs can at any time be *increased* by remitting for each addition, the price paid by the original members; or a small club may be made a larger one at reduced rates, thus: One having sent 5 subscribers and $6, may afterwards send 5 names more and $4, making 10 subscribers for $10.00; and so for any of the other club rates.

The German Edition.—All the principal articles and engravings that appear in the *American Agriculturist* are reproduced in a German Edition. Besides these, there is a Special Department, edited by an eminent German cultivator. Our friends can do good service by calling the attention of their German neighbors and friends to the fact that they can have the paper in their own language. Those who employ Germans will find that Edition a most *useful* and acceptable present.

Bound Copies of this Volume (40) will be ready on or before Dec. 10th. They are in the uniform style, cloth, with gilt backs. Price at the office, $2. If sent by mail $2.30. We can usually supply, at the same rate, any of the 24 previous volumes, or from volume 16 to 40 inclusive. Any *ten* or more volumes, in one lot, will be supplied at the office for $1.75 each; or be forwarded by mail or express, carriage prepaid, for $2 each.

Terms to New South Wales, New Zealand, Australia, Europe, etc.—To several inquirers. Under the latest revision of the Postal Union Regulations the price of the *American Agriculturist* (either English or German edition), including postage *prepaid* through, will be covered by 7 shillings sterling per annum. This applies to the above countries, and to all others embraced in the General Postal Union. The simplest mode of remittance is by Postal Money Orders, payable in London, to the order of Orange Judd Company. These can be readily cashed in N. Y. City at a slight discount, which the publishers will cheerfully pay. For Club rates (postage included), see page 42, and reckon the shilling sterling at 22 cents.

A New Seed Firm.—The firm of Thorburn & Carson, having dissolved in September last, the business will hereafter be continued by the firm of Thorburn & Titus, at the former location, 158 Chambers Street.

Rabbits and Fruit Trees.—"T. W. B.," New Rumley, Ohio, writes that he finds perfect protection in the use of Lard, one pound, and Crude Petroleum, one ounce, melted together. A piece of old carpet or other stuff, is saturated with this mixture, which he rubs upon the trunks of the trees, to give a very light coat. He states that it is effective against mice as well as rabbits. Various offensive substances will drive off rabbits, and we have no doubt that the odor of crude petroleum will do it. But has our friend tried it long enough to ascertain what may be the ultimate effect of applying so much grease to the trees. We give this, as we do many other things, upon the statement of our correspondent. A very slight application of oily material may not injure the tree, but on young trees especially we should advise caution in its use.

A Red for Roofs.—"A. C.," St. Mary's, Ga., asks for a recipe for staining or coloring the shingles on outbuildings red, as oil paint is too expensive. We know of no "stain" that will answer the purpose, that would be cheap. Some of the Mineral Paints are dull red in color, but they are merely a more or less impure oxide of iron which will not remain on the roof without a drying oil. If any one can help our friend in this matter, we shall be glad to hear from him. If red is not especially desired, a few applications of crude petroleum will greatly increase the durability of the shingles, and give them a pleasing, warm, brownish color.

At the Beginning of the Year.—We would say a word to the many new subscribers. In overhauling accumulated letters at the end of the year just closed, with the view of the disposing of the correspondence so far as practicable, we were surprised at the number of utterly useless letters. These, while they cost the writers from but one cent (Postal Cards) to three cents, in the aggregate count up a nice little sum. They are of no use to us, as we do not know who wrote them. The letters are often very full in those matters of interest to the writer, but omit the signature. Three-fourths or more of these letters and cards are upon matters of no interest to any other person in the world save the writers; and such letters, whether signed or not, we do not answer in the paper. It is a fixed rule to answer no merely personal inquiry in "The Basket." We give here no replies unless they are likely to be of use to a number of readers. These nameless letters, for the reason that we can not reach the writers, go to the waste-paper basket, and have to be sold by the pound. We ask our new-comers to recollect that it is only in very rare cases that any notice is taken of an unsigned letter. We do not publish the name if the writer desires to remain unknown. In such case he may use any name he chooses, but the *real name* must always be given. In the coming year we trust that our friends will remember this request, which is made as much for their benefit as for our own.

The Echo Farm.—This noted dairy farm, of which we gave a description a few years ago, has, as we are informed by its former proprietor, Mr. F. Ratchford Starr, passed into the hands of a joint stock company, with abundant capital. The future address will be "The Echo Farm Company."

Crops in Washington Territory.—From its far northwest situation we are accustomed to look upon Washington Territory as a cold and bleak country. On the contrary, its winters, especially on the coast, are remarkably mild. A correspondent, "R. S. H.," writing from Lopez Island, a part of San Juan Co., says that the deepest snow he has known was in 1879, when 27 inches fell, but it remained only three days. The land upon the Island is peaty, Oats, Barley, and Potatoes being the main crops. Oats yield from 40 to 100 bushels to the acre, and weigh from 26 to 42 lbs. to the bushel. Barley runs from 50 to 100 bush. to the acre. Potatoes vary all the way from 70 to 400 bush. to the acre, 100 being the average crop the present year. Wheat, which is not extensively raised, gives from 25 to 60 bush. to the acre. During the winter it rains three to six days in the week. In mid-summer there are often drouths of six week's duration, but during this time there are heavy dews every night, and vegetation does not suffer. This letter confirms the testimony of other correspondents as to the agricultural capabilities and prosperity of this Territory.

Nice Cooked Celery.—Thanks to the efforts of this and other journals, celery is now far more generally raised for home use as well as for the market. But the past dry autumn greatly stunted the growth, often entirely ruining the crop. It is scarce and high in the market, and short-stemmed, the stalks being greener and tougher than usual. On this account alone cooking it may well be resorted to, though it is always preferred cooked by a good many people, and if properly done is better thus, especially for all not possessed of effective mastication. The following method, new to us, we like very much, and more of the unblanched portion can be used, the extreme upper part being necessarily rejected, because always stringy and bitter. Chop it very fine, as fine as small peas. Put it into a sauce-pan, adding just enough water to cover it, and put on a tight lid. Boil ½ hour, or until perfectly soft. Leave the water with it, and add an equal bulk of milk, raising it to boiling. For each pint of the minced celery, take a large tablespoonful of butter, more if desired, and thoroughly mix it dry with two tablespoonfuls of flour. Add this to the celery until thoroughly incorporated with it, and cook a trifle. Salt to taste, and pepper if desired

Squash Bugs.—"W. N. A.," Starkville, Mass., sends a hint which our readers may do well to remember until next spring. He advises to place boards on edge to make a circular or other inclosure around the hill. Within this is to be placed a toad, provided with a shingle so placed as to afford it shelter from the sun during the day. As the bugs and toads both feed at night, he says that there is a lively time between them after nightfall. He states that the gardeners near Paris pay 15 cents (probably *centimes*) for toads to use as bug traps.

Spanish Chestnuts.—"C. W. G.," Bergen Co., N. J. What are sold in New York and other cities as Spanish or Italian Chestnuts, are the fruit of the European Chestnut, *Castanea vesca*, of which our native Chestnut is now regarded as a variety. The European tree has much larger fruit, but it is not so sweet as ours. The tree is a little less hardy than ours, but succeeds in the climate of New York and southward. It is kept in all the principal nurseries. In Europe there are several varieties, differing in the size of the nuts, their abundance, etc. Our own Chestnut varies greatly; we know of one tree that has nuts nearly as large as those from Europe, with the superior quality of our own. If you could get the nuts before they get dry or mouldy, and preserve them in sand, they would probably grow.

"My First Peach Orchard."—The author of an article with this title, given on page 22, writes that he omitted to give the date at which the pruning or cutting back should be done. While the superfluous shoots are to be removed as they appear, any time during the summer, he prefers the last of August or the first of September for the general shortening of the season's growth. This is an important item in peach culture, especially in forming the heads of young trees. It prevents the growth of long, weak branches, and also diminishes the weight of fruit.

Bee-keepers' and Other Conventions.—As autumn is the season of fairs in which cultivators of all kinds show what they have done, so winter is the time for conventions, in which special cultivators get together, tell what they have done, and how they did it, and what they intend to do, and how they propose to do it. These winter conventions are often of much interest and importance; it is a time of comparative leisure, when the members are not in a hurry to get home, and we get the results of the year's work of the various specialists. We are always glad to give notice of these conventions when permitted to do so, but when, as in case of the Michigan Bee-keepers, the notice of their convention, to be held early in December, reaches us only in time for our January issue, what can we do? We can only make use of this case to show to the Secretaries of all other such associations the necessity of sending the notices *early*—as soon as the time of meeting is decided upon. We do not like to be placed in the position of appearing indifferent to these meetings, as we are, when the notices come but a few weeks before the time. The announcement for a meeting in February should reach us the first week in January, and so on. Will the Secretaries please take notice?

Birds and Grapes.—C. Lauppe, Champaign Co., Ohio, has much trouble with the birds, which destroy his grapes. The Robin, the Cat-bird, and the Jay do much mischief, but the Oriole is the worst enemy, as it cuts a hole in the berry to get at the juice, and one will soon injure all the fruit on the vine, while the others take the whole berry and soon get their fill. Mr. L. has had the best success in the use of small steel traps, which he baits with some blue variety, such as the Ives. He does not care to catch the birds, as the snapping of the trap scares them away. Though Mr. L. has upwards of 70 varieties, he says, if confined to a single variety, it would be the Concord. He lays down his more tender varieties, and finds it pays to do so. The vines are laid upon the ground between two pieces of scantling, and covered by a board, or by laying corn-stalks over them. Vines need protection not so much from the cold as from the long continued influence of drying winds, and Mr. L.'s manner of covering accomplishes this.

Prof. Asa Gray.—A wide circle of friends will be glad to know, that America's great botanist has returned after more than a year in Europe. The visit abroad was not merely for recreation, but to make such studies and comparisons in European herbaria as will aid in the completion of the "Synoptical Flora of North America," so happily begun.

Old Postage Stamps.—Nonsense is long lived. There was some years ago an item in the papers to the effect that if old postage stamps were accumulated in large quantities, millions we think, they could be sold for a large price. Residence of buyer not stated. This absurdity every now and then crops out, and we have inquiries concerning it. Old postage stamps may be worth all the way from one to three cents a pound. That is they will bring the price of the poorest kind of waste paper—the only use to which they can honestly be put.

The Mammoth Tree in England.—The evergreens of our Pacific Coast are quite at home in England, and are a wonder to any tree-lover who visits that country. The "Big Tree" of California, *Sequoia gigantea*, barely exists in the Atlantic States, while in England it is one of their most rapid growers. A recent "Gardener's Chronicle" reports one, planted in 1857, when it was but two feet high, which is now fifty-six feet in hight; the trunk at two feet from the ground is eight feet and seven inches in girth. It is almost worth the ocean voyage to see the vigor and beauty of the "Big Tree" in a congenial climate.

Hops and Manures in England.—The "Gardener's Chronicle" gives several items from the "Agricultural Returns," for 1880, but does not state whether there has been a general census, or one relating to agricultural products only. We learn that the land devoted to Hop culture is 64,943 acres, of which 41,476 are in Kent. Manures of all kinds, including guano, bone, etc., were imported to the value of over eight millions of dollars. England does not raise enough of the "tearful onion" to supply the wants of the people, but pays two and a half millions of dollars to make up the deficiency. Besides she pays over half a million of dollars for imported pickles, in salt and otherwise.

Cabbage Worms Once More.—"J. R. S.," Rowayton, Conn., says: "Pour boiling water upon Tansy, making the infusion very strong. When cool, sprinkle the infested plants with it, giving the worms enough of it. I have tried it and found it effective."—We add this to the other remedies already published, and have no doubt that it will be useful if applied in time. The great difficulty is, that the applications are not made soon enough. When the cabbages begin to head, the worms can hide, when nothing will be of use.

American Apples in England.—Messrs. Materne & Mayer inform us that their latest advices show a great decline in prices. Boston Baldwins sold in Liverpool on the last days of November at 9*s* to 14*s*, the demand being light and the fruit arriving in poor condition. At these prices there can be little profit to any one.

Wild Cherry for Stocks.—"Inquirer," Dutchess Co., N. Y. The wild Black Cherries, of which there are two, with small fruit in long clusters, like those of currants, is too unlike the cultivated cherry to answer as stocks, and all attempts in this direction have failed. There is a wild red cherry (*Prunus Pennsylvanica*), with its fruit in umbel-like clusters, like those of the cultivated, that has been used as stocks; and the little Dwarf or Sand Cherry (*P. pumila*), but a foot or two high, has been used for stocks to form dwarf trees.

"Are Artichokes Good for Swine?" writes one of our friends. He certainly can never have seen the catalogue of Mr. E. F. Brockway, Ainsworth, Iowa, who gives a very full account of the feeding value of the tubers, and gives abundant directions for their cultivation. He does not describe the method of harvesting, as the animals who do that need no instruction. It may be added that Artichokes are not commended for fattening, but for growing swine. Experience abundantly shows that while corn is the fattening food, the Artichoke is of great value in building up a frame on which to place the fat.

Gypsum—Plaster of Paris.—"Amateur." When Gypsum, or crude Plaster, is heated to 273°, it loses the water it naturally contains, and becomes Plaster of Paris. Though the operation is often called "burning," it takes place at a comparatively low temperature. When mixed with water, it re-unites with that, and becomes chemically the same as it was before, and when re-ground, is probably as valuable as a fertilizer as the "raw stone." We say "probably," as we are not sure that it is quite so soluble as at first, though it is not likely that there is any perceptible difference in this respect. The usual time for applying Gypsum on clover, is in spring, when vegetation is just starting.

Kerosene and Canada Thistles.—"P. L. C.," Bloomington Ill., asks if Canada Thistles can not be killed by the use of kerosene? He states that he has killed both Horseradish and Burdock by cutting off the top and applying kerosene, and while he has no Thistles upon which to try it, is sure that this will prove "a sure cure." Where there are but few plants of Canada Thistle, or other persistent weed, there is but little difficulty in exterminating them. We have known a few plants of Canada Thistle to be killed by cutting them off, and placing a small handful of salt upon the cut surface. But when the plants have obtained the mastery, and are in large numbers, then the methods that serve for a few are impracticable. If the evil of weeds, like many other evils, could be taken in time—nipped in the bud, so to speak, farmers would have but little trouble. One great difficulty is, the majority of people are not close observers; they do not notice the first approach of the enemy. It is only when troublesome weeds, small enough and easily managed in the beginning, get fully established, and make their presence known by the falling off of the proper crop, that the alarm is given. The first Canada Thistle, if it be taken at the right time, will yield to the thumb and finger; a few years later, the whole force of the farm may be unable to eradicate the increase.

Attention is called to the III. Cover page, giving simply a list of Premiums offered. Every one not already having a copy, should send for the Illustrated Descriptive List (32 pages), even if not desiring any Premium. Its engravings and descriptions of a great number and variety of articles will furnish useful and interesting information.

A free copy of the above will be sent post-paid to any one desiring it, or to any one's friends, wherever located. A Postal Card Order will be sufficient, simply saying: **"Send A. A. Premium List to———"** *(giving plainly the Name, Post Office, County and State.)*

No Mystery.

There is no mystery whatever about this Premium giving. The paper could not be supplied to any subscriber at lower rates if the premiums were not offered, as some have supposed. The scale of single and club subscription rates is fixed by the actual cost of supplying the paper itself, as explained last month (page 542).

The premiums are paid out of advertising receipts, which are increased by increased circulation secured by premiums. Indeed, the paper can be made all the better on account of the premiums.

The Reading pages are just as valuable to every one without regard to premiums or advertisements, and the *reading* pages are and SHALL be worth far more to every reader than the small subscription cost, which is only at the rate of 2 or 3 cents a week.

A Good Thing All Round.

As manufacturers know that we aim to supply *only* good, reliable articles as Premiums, and that placing an article in our list is an endorsement and gives it wide publicity, they are quite glad to supply the articles below cost (when given as premiums *only*) or, on the extraordinary terms which enable the publishers to offer them as they do.

Yet every article is just as valuable to the recipient as if he or the publishers paid its full regular price.

For the convenience of ALL our readers, arrangements are made to purchase premium articles at regular prices, and supply them to any friends desiring them.

A Double Benefit.

While this Premium Arrangement enables our readers to obtain valuable and desired premium articles **without cost,** by simply collecting a few or many names of their friends and neighbors (or at small cost if they take the subscriptions in clubs at club rates, and make up the difference), there is another good thing about it, thus: Of all the people in this country engaged in cultivating the soil, only about *one in forty* read any trustworthy, practical journal treating of their business. Yet every man who *reads* and *thinks* more about his work and his methods, will work better, plan better, profit more, and his mind, his thoughts, and his character will be elevated. And his family will be benefited.

So every one does a good work who succeeds in inducing another to become a *reader* of any good journal, whether he is himself stimulated to do this by the premium offers, or by his desire to benefit others, or by both motives.*

More than 40,000 Friends

have received valuable premiums from this Office, as tokens of their efforts to get their neighbors to reading. Some have received books or smaller articles for two, three or more subscribers sent in. Others have secured Hundreds of Dollars worth, and still others several Thousand Dollars worth of the Premiums. One at least received enough from the sale of articles obtained as Premium, to pay for a large farm, with stock and buildings.

We Invite Every Reader

To take some part in this enterprise, even though but a limited one. There are desirable premiums for sending only *one new* subscriber, or two or three new and old subscriptions. Other more expensive articles are worth the effort required to collect a larger list....And

It Can be Easily Done.

as proved by over **40,000** others. One subscription a day (or evening) will count up largely during the winter, and the premiums are open up to June. The subscriptions can come in as obtained, and the premium be taken *whenever* the desired list is made up. If the premium most desired is not in the end secured, others can be selected corresponding to the number of names sent up to any date.

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* NOTEWORTHY.—During 30 years past, the *American Agriculturist*, by its premiums and other pushing enterprises, has awakened the attention of people and led more persons to patronize and READ about Farm, Garden and Household work, than any other ten journals, if not more than all others combined. A multitude of people thus awakened are now the supporters of other local journals. Many new journals, some very good ones, have taken up the methods long ago originated by the *American Agriculturist*, to promote the spread of good reading.

Commercial Matters—Market Prices.

NEW YORK, DECEMBER 7, 1881.

Though in the aggregate of less magnitude than through the preceding months, business in Breadstuffs has been again on a very liberal scale, especially in Grain, the speculative dealings in which have been characterized by great activity, and by frequent and sometimes sharp changes in prices. The drift most of the month has been to lower figures, under a pressure to realize, but toward the close rallying again, leaving off irregularly. Export operations have been to a moderate extent, having been checked quite seriously by the speculative disturbances in values. Supplies in sight and at the seaboard have been diminishing, while the amount afloat and on passage for Western Europe has been on the increase. With inland navigation nearly ended for this season, receivers have been disposed to talk more hopefully of the outlook, but the stringency in money loans and discounts has been embarrassing to speculative holders, many of whom have been obliged to force their supplies on the market, thus contributing to the derangement and depression of prices, and the general injury of legitimate trade. Sympathizing closely with Grain, Provisions have been very variable, hog products leaving off heavily, on freer offerings, and only a moderately active movement, though, recently, shippers took important quantities, chiefly of Lard and Bacon—partly for France, whence came reports of a rescinding of the decree prohibiting importations of meats from America....Cotton has been worked up to higher figures, on a livelier business, mainly in the speculative interest....Wool has been quoted somewhat easier and irregular, on a tamer market....Hogs have been in less request but have varied little in price....Tobacco attracted less attention, though favoring buyers....Ocean freights have been unsettled—leaving off for Grain weaker—including by steam for Liverpool at 3½*d* (6¾cts.) per bushel, and for Provisions and most other classes of cargo-steadier, including Provisions by steam for Liverpool at 12*s* 6*d*@15*s* ($3.00@$3.75) per ton.

The following suggestive tables show

Breadstuff Movements at New York during each of the last Two Months.—(The Sales largely speculative.)

	RECEIPTS.		SALES.	
	Past Month.	*Previous Month.*	*Past Month.*	*Previous Month.*
Flour, bbls.....	460,900	448,000	419,000	387,000
Wheat, bushels,	3,165,000	3,189,000	57,823,000	57,305,000
Corn, "	4,439,000	2,736,000	36,951,000	42,460,000
Rye, "	355,000	175,000	229,000	202,000
Barley, "	1,210,000	343,000	438,000	337,000
Oats, "	735,000	605,000	7,476,000	9,568,000

Classification of Sales at New York in each of the last Two Months.—(The Sales largely speculative.)

	For Prompt Delivery.		*For Future Delivery —"Options."*	
	Past Month.	*Previous Month.*	*Past Month.*	*Previous Month.*
Wheat, bu....	5,194,000	5,585,000	52,629,000	51,720,000
Corn, bu.....	5,565,000	4,894,000	31,951,000	37,566,000
Oats, bu.....	2,261,000	2,188,000	7,496,000	6,380,000

Exports of Breadstuffs from New York,

	Past Month.	*Previous Month.*
Flour, bbls.....	245,200	235,500
Wheat, bushels	2,386,600	2,559,000
Corn, "	2,341,000	2,668,500
Rye, "	179,000	78,000

The quantity of Wheat on passage for the United Kingdom and the Continent, to December 1, from all sources, was equal to 26,480,000 bushels; and of Corn, equal to 3,040,000 bushels, against, at about the same time last year, 22,464,000 bushels Wheat, and 7,398,000 bushels Corn.

Stock of Grain in store at New York.

	Dec. 5, 1881.	*Nov. 1, 1881.*	*Dec. 6, 1880*
Wheat, bushels....	5,616,536	6,241,935	5,670,742
Corn "	6,065,338	5,796,411	2,508,081
Rye "	102,083	60,611	166,654
Barley "	66,963	52,057	163,592
Oats "	1,069,103	1,796,060	809,982

The visible supplies of Wheat—embracing hoards at lake ports, in transit, and on the seaboard—at latest dates, embraced about 19,816,300 bushels; of Corn, 20,634,000 bushels; of Rye, 1,399,000 bushels; of Barley, 3,339,000 bushels, and of Oats, 2,912,200 bushels, against at the same time a year ago, an aggregate of 24,622,500 bushels Wheat, 16,683,750 bushels Corn, 871,650 bushels Rye, 2,449,400 bushels Barley, and 3,657,300 bushels Oats.

CURRENT WHOLESALE PRICES.

	Nov. 7, 1881.	Dec. 7, 1881.
FLOUR—Super. State & West	$4 00 @ 5 25	$4 25 @ 5 25
" Low Shipping Extra....	5 15 @ 5 75	5 00 @ 5 60
" Extra Southern.....	5 75 @ 8 50	5 75 @ 8 25
" Extra Western.....	5 10 @ 9 00	5 10 @ 8 75
" " Minnesota.....	5 25 @ 9 00	5 15 @ 8 75
RYE FLOUR, Superfine.....	5 00 @ 5 50	4 80 @ 5 30
CORN-MEAL, ₱ bbl.....	3 10 @ 3 90	3 15 @ 3 85
WHEAT—All kinds of White.	1 25 @ 1 42½	1 27½@ 1 42½
" Red and Amber.....	1 00 @ 1 45	1 25 @ 1 46½
" Spring.....	1 05 @ 1 41	1 10 @ 1 46
CORN—Yellow.....	— @ 73	70 @ 72½
" White.....	— @ 74	71 @ 73½
" Mixed.....	65 @ 70	66 @ 72½
OATS.....	47 @ 53	49 @ 56
RYE.....	1 01 @ 1 05	97 @ 1 01
BARLEY.....	85 @ 1 17½	83 @ 1 15
PORK—Mess, old, ₱ bbl.....	17 50 @ —	17 55 @17 50
" " new, "	— @ —	18 25 @18 50
LARD, Wes'n steam, p. 100 lbs	11 40 @ —	11 30 @11 35
TALLOW, ₱ 100 ℔s.....	7 87½@ 8 00	7 25 @ 7 37½
STEARINE, ₱ 100 lbs.....	11 50 @11 75	— @11 75
HOGS, dressed, ₱ ℔.....	8 @ 8¾	7¾@ 7¾
COTTON, Middlings, ₱ ℔.....	11⅝@ 11⅞	12⅛@ 12½

Osiers—Willows.—"F. H. W." There seems to be a common impression that there is but one basket Willow, and that the Osier. In fact, the very poorest Willow, and fit only for the coarsest farm and other heavy baskets, is the Osier. The finer basket Willows, such as are used for small work, have both in England and on the continent local names, there being a dozen or more distinct kinds. There is but little inducement at present for any one to undertake Willow culture if the product is to be sold, as the business is mainly controlled by a few importers, who will not buy the American product. The only way in which the Willows can be disposed of is through the general produce merchants, who sell them when they get a chance customer, but there is no regular trade, save in imported stock. The Colt Establishment, near Hartford, works up its own Willows, and finds no difficulty in making the most beautiful articles from a stock of American growth.

Salt on Wheat.—"L. H.," and several others. While on some soils salt produces no apparent results, on others it is of marked benefit. Its utility can only be learned by experiment. It often has an indirect action, in enabling the plant to take up Silica and strengthen the straw. Its effect in preventing the growth of those minute fungi which cause rust and smut, is sometimes beneficial. After cold weather has put a stop to the growth of the plants, salt sown at the rate of five or six bushels to the acre, often increases the health of the plant and improves the appearance of the grain.

Assays of Minerals.—Those who send us specimens of minerals should recollect, that while some minerals may be determined with fair accuracy by a mere inspection, others require chemical examination, for which we have not a laboratory or the time, and unless provision is made for an assayer's fee, we can make no report.

Reports of Horticultural Societies.—In filing away the Reports that have been sent us from time to time during the past year, we are reminded in the first place to make a general acknowledgment to those secretaries who have not had a special one. We observe that the Reports, as a rule, are less bulky than in former years, while they are correspondingly more valuable. It may gratify Mr. Smith to read that he exhibited 23 varieties of the common apples, with the list of their names, or Miss Jones, that she had the same thirteen chrysanthemums, the list of which is published this year, as it has been every one of the past dozen years. These matters make work for the printers, and increase the bulk of the Reports, but they do not add to their value. The Sixth Report of the Montreal Horticultural Society is a model in its way. Its mechanical execution is excellent, and its papers of commendable brevity, and all the more valuable for being on local matters. The same may be said of the Proceedings of the 26th Annual Meeting of the Western New York Horticultural Society. This is one of the "meaticst" Reports that come to us and always contains useful matter. The Ohio and the New Jersey State Horticultural Societies both have our thanks for their valuable Reports.

Preserving Eggs.—Numerous correspondents have asked if there is not some method of preserving eggs for an indefinite length of time, so that they can not be told from fresh eggs, without the use of lime. So far as we are aware, there is no method practicable, on a commercial scale, other than the use of lime-wash. For home-use, several plans have been tried with more or less success. To preserve eggs, the pores of the shell must be stopped up, for two reasons: to prevent the entrance of the air, and consequent spoiling of the contents; and to prevent the evaporation of the moisture of the egg and a drying up of the contents. Placing the eggs in a net or basket, and plunging them for a few seconds in boiling water, long enough to cook or solidify a thin film of the white next to the shell, is successfully practised in some families, but it would spoil the eggs for sale. Closing the pores by smearing the shell with lard, suet, or linseed oil, has been tried with more or less success. Many years ago a patent was taken out for the use of shellac varnish for the same purpose. The care required in the use of the varnish, as each egg must be treated separately, and as a slight uncovered space would allow the egg to spoil, besides the discoloration, prevented this from coming into use. If any one can suggest any method better for commercial purposes than the lime-wash, we should be glad to have it.

Japan and Japanning.—Several inquirers. These terms are used with very different meanings. What is known as Japan, or Japan Drier, and used to mix with paint, is made with Linseed Oil, Litharge, Umber, and sometimes other ingredients. It cannot be readily made on a small scale, and it is better to buy it. The process called Japanning, as applied to wood, pasteboard, etc., consists in the use of a varnish made of Asphaltum, Anime, or other gums, with oil, the work being afterwards exposed in an oven to a heat of about 300°, to make the varnish flow, and give a beautiful smooth surface. The Japanning of common articles of tinware, which gives a rich brown color, is done by applying a varnish made by dissolving Asphaltum in turpentine, and adding a little linseed oil to toughen it.

Success in Artificial Incubation.—"W. H. L.," New Orleans, La., writes; "Last March I placed in my incubator 180 eggs bought on the market at 20 cents per dozen. At the end of the eighth day of incubation, examined them, took 30 unfertile out of the lot, leaving 150 containing chicks, as far as could be seen; I lost a number by a stroke of lightning, which fell next door, and others died at different stages. Out of the lot I hatched 120 healthy chickens, and I raised out of these 110, which attained maturity. I raised them artificially, that is without a mother, the heat being furnished by the lamp of the incubator. As for showing them how to eat, scratch, etc., I had no trouble, as I had several young chicks hatched by a hen, which I put in among them at night, since which time they have taken care of themselves."—This is an encouraging report for those who contemplate raising chicks artificially. When we take into account the fact that the eggs were bought in the market, and had no special care in handling, the proportion that hatched is remarkable. A former associate some years ago made the statement that he had just as good success with barrelled eggs sent from the West, with all the rough handling they must receive, as he did with eggs carefully packed by those who advertise "eggs for hatching."

Earwigs.—"W. B.," Bergen Co., N. J.—The insect so troublesome to European gardeners, called Earwig in England, is not known in this country. It is a nocturnal insect, nearly related to the Cockroach. It is said to be called Earwig, because it hides itself in any hole or crevice, and has been known to take refuge in the human ear. Others say the name is properly Earwing, in reference to the shape of its short wings. What is often called Earwig in this country is not a true insect, but one of the Myriapods, related to the tropical Centipede.

Osiers—Willows.—"J. D.," Shepherdsville, Ky. The common Osier is only suited for very coarse work, such as farm baskets, etc. For the finer wicker work, various kinds of willows are used, and most of the large nurseries can supply them. We cannot give you prices.

Pruning the Norway Spruce.—N. A. Briggs, Merrimack Co., N. H., asks the proper season for pruning the Norway Spruce, and like several others who have made the inquiry, omits to say what is his object in pruning. Pruning may be done for very opposite ends. If the Spruce is planted as a hedge or screen, then it needs to be dwarfed, rather than encouraged to grow upward. Cutting back the new growth, before it has yet hardened, is generally done in June: this has the effect to keep the tree in a dwarf, compact form. If the object is merely to regulate the shape, by removing or shortening certain branches, it may be done in autumn at any time before severe weather comes. For cutting away the lower limbs of a Norway Spruce, or other evergreen, there is no one "proper time."

Pruning the Peach Tree.—"D. W. C.," Syracuse, N. Y. By cutting back from one-third to one half of the previous season's growth on a young tree, and at the same time removing altogether any crowded branches, a more compact head is formed. Besides, the tree is less likely to break down from the weight of fruit, which is more evenly distributed. This cutting should be done very early in spring. We recently saw in Massachusetts some trees that had been thus treated; all were compact and shapely, and the foliage was remarkably vigorous and healthy, while those that were in bearing had the fruit evenly distributed. Especially in garden culture is this treatment advisable.

Mealy Bugs.—"H. T. W." When these first make their appearance upon window or greenhouse plants, commence the attack. It is not difficult to keep them under if taken in hand at their first appearance. Keep a small bottle of strong alcohol or benzine, with a camel's-hair pencil fixed to the cork, and when a mealy bug is seen, give it the least touch of the liquid. We have of late years used nothing, applied (so to speak) with a pointed stick. Whittle a piece of soft pine down to a very sharp point, keeping several such sticks in handy places about the greenhouse. Whenever a mealy bug is seen, impale it on a pointed stick and remove it. It is very easy if you begin early and keep the mastery.

Sending Poultry to Market.—Messrs. E. & O. Ward, the veteran commission dealers, have learned that an impression can be made on some people only by hammering away. None better than they know the immense aggregate loss to senders of poultry to market, through the neglect of a few simple points, which are easier to observe than to omit. In their large general circular they give directions for preparing poultry for market; in autumn they send out a Special Poultry Circular, and towards the Holidays they publish a condensed form, in which they say:—"To insure highest market prices, poultry must be well fattened: crops empty when killed: kill by bleeding, but do not remove the head; have them nicely and well picked, the skin not broken or torn; the entrails should not be removed; thoroughly cooled but not frozen. Pack in boxes, with a layer of clean straw (Rye straw the best) between each layer of poultry, in the same posture in which they roost. Mark each box, specifying what it contains. Send invoice by mail. Ship to reach us about the middle of the week—should never reach us so late in the week as on Saturday. Turkeys weighing over 11 or 12 lbs. are in very little demand after New Year's Day. If you cannot find any profit in sending prime quality and well prepared, you need not look for any in ordinary or poor qualities. *We repeat again and again—see to it that every package is marked with your name or initials, and also what it contains, and send invoice.*" The Messrs. Ward suggest that by adhering to the above, on one consignment shippers of poultry will save more than a year's subscription to the *American Agriculturist* will cost them.

A Correction.—In Professor Caldwell's tables under "Food Rations for Milk," Dec. 1881, page 517, there is an omission of a single period, which has brought confusion to some of our readers. After Cotton-seed meal, instead of "25 lbs.," read 2.5 lbs. This is an easy mistake to make, and one that might lead to great error.

Experience with Barbed Wire Fence.—"A. H. G.," Grand Rapids, Mich., is of opinion that the different reports as to the value of barbed wire fencing are due to the manner in which it is put up. His first attempt was with barbed wire alone. A dog drove his herd of 11 cows at and through the fence, one cow being so injured in the udder that she was turned into beef. After this accident he nailed one board at the top; the animals now see it, and he regards this as the best fence on his farm. On another farm he keeps a number of colts, which had the habit of breaking down and going through the board fence. He set posts about 20 feet apart, and placed a single wire upon these at about 10 inches above the boards. His neighbors predicted that the colts would injure or kill themselves with this barbed wire, but though some of the colts are very mischievous, none have been over or through the fence, or have even been scratched. Mr. G. finds great satisfaction in getting the better of an unruly horse.

Feed Mill Prizes.—J. A. Field & Co., makers of the well known Big Giant Feed Mills, offer four of their mills as premiums; two for the first and second best results in cattle feeding, and two for the same in hog feeding. The conditions for competitors can be had by sending to Messrs. J. A. Field & Co., St. Louis, Mo.

Soldering Copper or Brass.—"H. W." The liquid used by tinsmiths and other workmen to cause soft solder to adhere to copper, brass, and even to iron, about which some maintain a secrecy, is merely a crude chloride of zinc. To make it, put a little muriatic acid into a wide-mouthed bottle of twice the capacity. Set this out of doors, on account of the odor, and add zinc cut in strips, so long as any is dissolved. In soldering copper, brass, or iron, scrape the spot bright, place upon it a drop or two of this liquid and apply solder in the usual manner.

A Freight Car-Load.—The ordinary freight cars used on the different railroads, can each carry: 400 to 450 bushels of wheat; 500 bushels of Indian corn; 400 to 500 bushels of Potatoes; 800 to 900 bushels of oats; 125 barrels of flour. This is 12 to 14 tons (of 2,000 lbs.) weight the car load.

Statistician at the Department of Agriculture.—Col. J. R. Dodge, who found that the Department was not large enough to contain both himself and LeDuc, and departed for a while, has been restored to his old position by Commissioner Loring. An excellent thing for the Department, and for the country.

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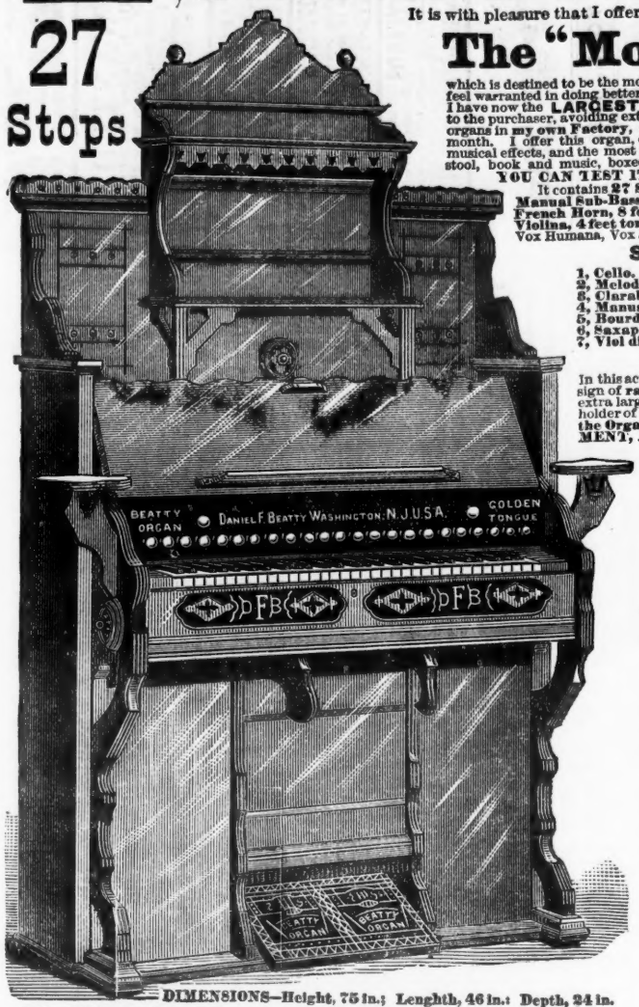

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3, Clarabella.	10, Grand Expressione.	17, Voix Celeste.	24, Right Knee Stop.
4, Manual Sub-Bass.	11, French Horn.	18, Violina.	25, Automatic Valve Stop.
5, Bourdon.	12, Harp Æoline.	19, Vox Jubilante.	26, Right Duplex Damper.
6, Saxaphone.	13, Vox Humana.	20, Piccolo.	27, Left Duplex Damper.
7, Viol di Gamba.	14, Echo.	21, Coupler Harmonique.	

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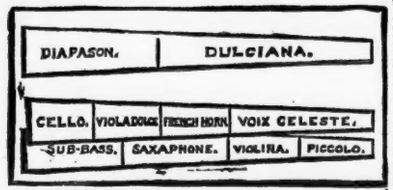

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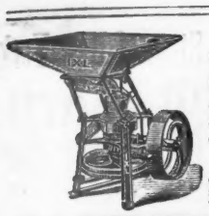

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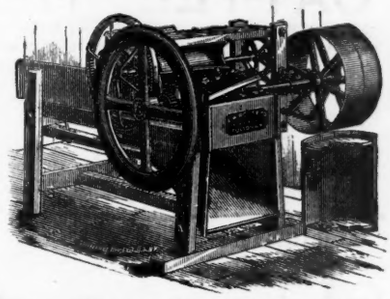

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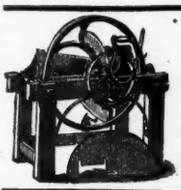

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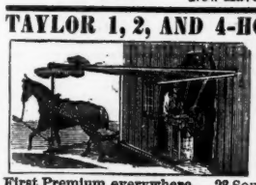

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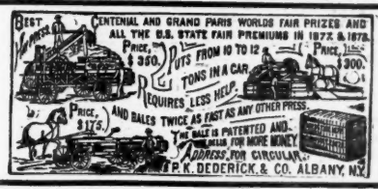
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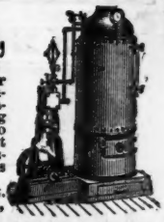

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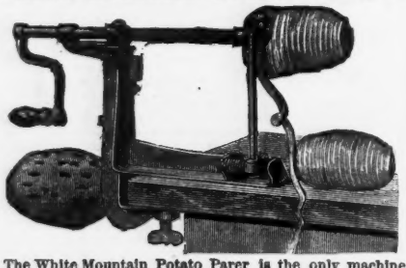

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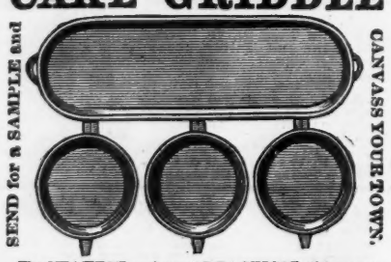

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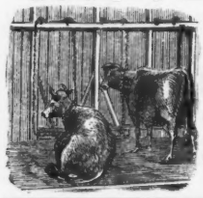

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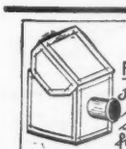

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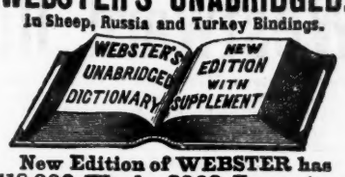

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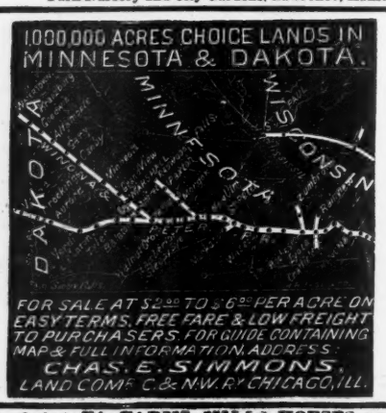
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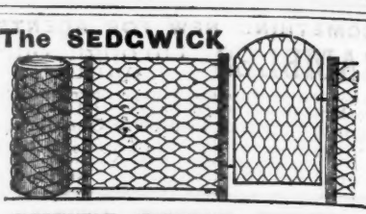

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